CONTRIBUTION

TO THE

ICHTHYOLOGY OF AUSTRALIA.

BY

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No. I.—THE MELBOURNE FISH MARKET.

My intention is, if circumstances allow me, to submit to the public a succession of papers on the fishes of Australia. This first one is devoted to the description of the different sorts I have observed at Melbourne, alive or in a fresh state, during more than a year, and which almost all come from the Fish Market. The number of sorts (142) is very limited, compared with what could be collected during the same period in other countries, such as India or South America; but, if many of the South Australian forms indicate their *habitat* in a semi-tropical climate, the diversity of species is not so great as in most regions equally situated. This seems to be the rule with the Antarctic Seas, as at the Cape of Good Hope, after several years' researches, I could only obtain 157 sorts (with ossified skeletons or *Teleostei*, Gunther), many of which came from distant parts, such as Lake N'gami, Natal, &c. Since then, many sorts have been indicated as from South Africa, and their number is so considerable in the *Catalogues of the British Museum* as to make me, in many cases, doubt of the exactness of the assigned locality. All the fishes of Sir A. Smith's collection have been inscribed as coming from the Cape sea, while I believe that many were obtained at very distant

localities. During several years, not only did I visit several times a day the Fish Market of Cape Town, but the Malay fishermen were most active in endeavouring to obtain specimens for me. Sir A. Smith himself, in his "Illustrations of South Australian Zoology," mentions a number of sorts of fishes much smaller even than the one I obtained myself (about 40); and Dr. Pappe, after ten years' study of the fishes of the Cape, only mentions 45 sorts of edible ones. ("*Synopsis of the Edible Fishes of the Cape of Good Hope.*" Cape Town, 1853.) As a general rule, I believe that the great Antarctic Sea will be found to contain less sorts of fishes than most others, and that this will also be the case with the rivers and lakes of the same regions. With few exceptions, the fishes of the southern parts of Australia are peculiar to the region they inhabit, as of 142 sorts (exclusive of a doubtful sort of *cyprinidæ*), 11 only are found in other regions, that is, 5 of the 123 sorts of *Teleostei*, and 6 of the 19 species of cartillaginous fishes. The five of the first are—1. *Temnodon Saltator*, which is very widely spread over almost all the tropical and temperate seas of the globe. 2. *Thyrsites Atum*, found also at the Cape of Good Hope. 3. *Tetraodon Hispidus*, found in the Red Sea and all over the Indian Ocean. 4. *Diodon Spinosissimus*, from the Cape of Good Hope and the Indian Sea. 5. *Orthagoriscus Mola*, from the European seas. To this I ought, perhaps, to add *Mugil Waigiensis*, first discovered in New Guinea; but this large island may be considered as belonging to the Australian zoological zona.

Amongst the cartillaginous fishes, we find *Sygœna Malleus*, *Galeus Canis*, *Rhina Squatina*, *Raya Oxyrhynchus*, and *Myliobates Aquila*, all found in the European seas; and *Chimœra Antarctica*, from the Cape of Good Hope. It would seem as if the more the bones take a cartillaginous nature, the more the animal would be able to support the changes of climate, &c.; but it must also be observed that some of these last sorts have not been sufficiently well compared with European specimens.

The fact that not one single true *Serranus* seems to inhabit the southern shores of Australia (*S. Rasor* being very distinct in general appearance) is also remarkable, as I had already observed the same fact at Table Bay; and here also, on the eastern coast, as at Natal and Algoa Bay, several sorts of real *Serranus* are found.

I certainly do not mean to give to these observations an exaggerated importance, as I am well convinced that I have not yet seen one-half, perhaps not one-third, of the sorts that inhabit the Bass Straits, and even Hobson's Bay. Very little interest has been, till this time, felt in the Australian Colonies, on subjects of natural science, and I have found it impossible to get the fishermen to collect for me the sorts that are not usually considered as edible, and they almost always prefer throwing away specimens valuable for science, and for which they might obtain a remuneration larger than the one they get for eatable fishes, sooner than take the trouble of bringing them to the market. This indifference extends to all classes, and though the Acclimatisation Society has requested, several times, in the public newspapers, persons desirous of helping it in the task of making better known the zoology of Victoria,, to send any specimens they may obtain, no answers have been received. It is singular to remark that not one of the Australian Colonies has a particular work on one single branch of its zoology, whereas every State of North America has a complete series of valuable works on each branch of that science. In this the Australian Democracy seems to be far behind its American sister. The only, very scanty, materials published on the fishes of Victoria consist—1st. Of a paper of W. Blandowski on the sorts he had collected in the interior of the Colony, and particularly in the Murray River. This paper was to be inserted in the "Transactions of the Philosophical Institute of Victoria," vol. 2, pages 124 to 132. It was accompanied by four plates, representing in a rough way nineteen sorts of fishes, many of which are unknown to me. A rather curious anecdote is told of this production: The author had, according to the custom of naturalists, dedicated several of the sorts to leading members of the Society; but some of these gentlemen are said to have taken as an insult what was most probably intended as a compliment, and the letterpress and plates already engraved were withdrawn and destroyed before distribution. I must own that I cannot say much for the scientific value of the paper, but I have found in it a few observations on the habits of several sorts of the interior rivers.

2nd. Of a short notice on the fishes of Victoria in Professor M'Coy's Report on the Zoology of the Colony, in the "Inter-colonial Exhibition Essays, 1866-1867." In this paper the learned author has endeavoured to give the scientific names of the common fishes of the market, and in this he has, in general, well succeeded. There are also to be found some interesting observations on several sorts in this essay.

3rd. A short paper by Dr. Gunther on a few Victorian sorts in the "Annals and Magazine of Natural History, 1863."

4rth. Several papers of Sir J. Richardson in the "Transactions of the Zoological Society" (vol. iii.); the Proceedings of the same, 1839-1840;" and in the "Annals and Magazine of Natural History, 1842-1843."

But if the materials on Australian fishes, published in works particularly devoted to them, are few, on the other hand all the publications made on the Scientific Expeditions sent by England, France, and other countries contain numerous descriptions and plates of Australian sorts, and Sir J. Richardson, in the "Ichthyology of the Voyage of the *Erebus* and *Terror*," has given a most valuable account of the sorts brought by that expedition from the Antarctic Seas. The work of this celebrated Ichthyologist forms the most valuable contribution to Australian Ichthyology ever published.

Of the general works on the science, two deserve a special notice. The first is the great "*Histoire Naturelle des Poissons*" of Cuvier and Valenciennes, which was left incomplete at its 22nd volume by the death of the first of its illustrious authors. This work is the base of the science, and not only recapitulates in an admirable manner all that had previously been published on it, but describes an immense number of new sorts. It is in this magnificent work that the great Cuvier gives the details of the system of which he had published the outlines in his "*Règne Animal*."

The second is Dr. Gunther's "Catalogue of the Fishes of the British Museum," complete in eight volumes. This work is one of the most remarkable productions of modern science, and places its author high amongst zoologists. Dr. Gunther follows Cuvier's system, but amends it considerably, and it must be

owned that most of his changes are improvements on it, and in conformity with the natural arrangement of beings. The labour, patience, and science shown by the author are deserving of the greatest praise. After having said all the good I think of this great work, I must also submit a few critical observations on it. Many of Dr. Gunther's superior divisions are established only on anatomical characters, and I think this most objectionable, as it would exclude from the study of science all those who would not have at their entire disposition one of the large museums of Europe, and even the fortunate zoologists who are so situated can only, in comparatively few instances, sacrifice valuable specimens. I think that anatomical characters ought only to be used to confirm zoological ones.

Dr. Gunther, in most cases, prefers describing the colours from the discoloured specimens he has at his disposition sooner than adopting the description of travellers who have seen the sorts alive, and in many cases have made drawings from specimens so taken. For instance, *Phractocephalus Hemiliopterus* is described as a fish of obscure tinges, when he had my plate under his eyes, showing its beautiful colours, drawn from the living specimen.

He changes the names, derived from Greek or Latin, that he considers badly composed, and this I think useless, as it only increases synonymy unnecessarily. If men with the high literary acquirements of Lacepede and Cuvier have committed such mistakes, no one can expect to be exempt from them, and as names without any meaning are just as good, if not better, than those which pretend to have one. If a name is not well made, it is more simple, I think, to consider it as having no meaning at all, than to introduce a new one into the nomenclature.

Dr. Gunther divides the species admitted by his predecessors into two classes—those that he considers well characterized, and those that he regards as doubtful; he only gives descriptions of the first, which have almost all been seen by himself; and as to the others, it is necessary to resort to the original works, as amongst them a very large proportion have just as good a right to be maintained as those he admits. He must be approved of for rejecting, till further examination, all sorts established on figures and drawings only. Lacepede was the first to

introduce into the science numerous sorts founded on these materials, and he went so far as to consider as sufficient documents rough paintings due to Chinese and Japanese draughtsmen. When he only used materials due to such men as Commerson, Forster, &c., he was pretty safe; but even then, it is well known that a naturalist, travelling in little known countries, is often so pressed for time as to necessarily neglect in his drawings many characters that will be found necessary when they will be submitted to the scrutiny of modern science. Putting these aside, there remains in his so-called *uncharacterized sorts*—an immense number that have been seen by his predecessors; and I think that when such authorities as Cuvier, Valenciennes, Richardson, Bleeker, Kaup, Ruppell, &c., admit them as distinct species, after having studied them, they are at least as much entitled to be believed as the zoologist who has not even seen them.

Taken, for example, the sorts brought back by myself from the central parts of South America, and deposited at the Garden of Plants of Paris, we find that Dr. Gunther considers many of them as identified with species of Cuvier and Valenciennes, when, in the Ichthyological part of my Travels, I give them as distinct. Perhaps the imperfection of my descriptions may have led him to believe in their identity; but it must be remembered that those specimens were all compared with Cuvier and Valenciennes' types, aside of which they are placed in the Museum, and that this examination was not only done by myself, but in many cases by Messrs. Valenciennes and Dumeril, and in all cases by Mr. Guichenot. On the other hand Dr. Gunther appears not to have examined the Parisian collection, which is certainly the most important in the world, on account of the immense quantity of typical specimens it contains.

I also think that Dr. Gunther carries too far the modern tendency of uniting sorts that were considered as distinct, and, misled by this principle, he has formed a certain number of artificial species which do not exist in nature. It is well known that in the class of fishes colours are, in general, subject to such alterations as not to afford, as a general rule, specific characters, as they do in almost all the other divisions of the animal kingdom, and that these characters must be looked for in the forms

and sometimes in the distribution of bands, stripes, &c. In many cases, the learned doctor goes much further, and supposes even these forms to be subject to such variations as no specific characters would remain, and so, only to quote one example, to have the satisfaction of uniting the *gonorhynchus* of the Cape with those of Japan and of Australia, he is obliged to suppose a sort whose proportions vary according to age, which sort does not exist.

I also think that Dr. Gunther shows too little attention to the geographical distribution of fishes. He delights in stating that a sort from the Northern Sea is found at the Cape of Good Hope; that another from the coast of Senegal inhabits also the Antarctic Sea. Even fresh-water fishes, whose *habitat* had, till now, been considered as very limited, are submitted by him to the same process, and sorts from the rivers of Chili are united with those of Tasmania, or English sorts are said to be found in New Zealand. In many cases he asserts that they are not entirely similar, and even goes so far as to propose names for those *varieties*, but nevertheless they must be included under the same specific names. He seems to admit too easily new localities, and so, to give one example, the largest of all fresh-water fishes, the *Pirarucu* (sudis vastres), is said, on the authority of a dealer, to inhabit Bahia, without telling us what river of that locality is capable of feeding such a giant. The truth is, that it is restricted to the Amazonas and to its northern branches. It is also found in those of the rivers of Guyana, whose head waters, during a part of the year, or at least in floods, communicate with the branches I have just mentioned.

The old authors, such as Bloch, Lacepede, &c., never hesitated to state that a species inhabited Greenland and India; but under the scrutiny of Cuvier and Valenciennes these sweeping assertions generally proved incorrect, and new ideas were introduced on the distribution of sorts in the waters of the world. But after having studied Dr. Gunther's work with the attention it so well deserves, one finds onself once more wandering in a complete sea of uncertainty, and it will take years of careful study to re-establish some rules in this part of geographical zoology. This I consider as the greatest fault in Dr. Gunther's most valuable work.

It is also to be regretted that the learned doctor does not add to his qualities a little more indulgence towards other naturalists, often his predecessors in the science. He has placed himself, by his works, quite high enough not to be quite so bitter towards those who have not, like himself, the privilege of never being mistaken. Even in speaking of Cuvier, the master of all modern naturalists, he cannot refrain from this habit of rude criticism, which so often becomes offensive. It is to be regretted that he has not, with so many other things, learned from the great man I have just mentioned to correct with urbanity the mistakes of others. If Cuvier was obliged to rectify a traveller or a little known naturalist, he would do it in such an indulgent way as to encourage him to pursue his labours; and if he had to correct a man high in science, Linnæus for instance, he was always disposed to add that a little inattention was well excusable in the man of genius who had imposed on himself the task of describing the immensity of Nature. It is evident that Dr. Gunther's greatest delight is to find fault with everyone and with everything. When he mentions a plate, he must almost always add one of the following epithets:—"Not good." "Bad." "Very bad." And in many cases he has never seen the fish in question, and the drawing is due to one of those artists who, having devoted the labours of their lives to zoology, have become naturalists of no small merit themselves. His love for criticism is such as to make him point out mistakes that have been already corrected by the author himself. For example, in describing my *Holacanthus Formosus*, he says in a note that the number of the fins are entirely wrong as I have stated them, when, in the *Errata* of the work ("Fishes of South America"), in the Zoological part of my Expedition (p. 112), I myself corrected the mistake, and re-established the real numbers.

One of the greatest beauties of the study of Nature is generally considered to reside in the brotherly feeling it establishes between men of all nations, of all ages, of all ranks. It is the greatest boon of sufferance, and often the only consolation in misfortune; but if it was to be followedi n the spirit with which some modern naturalists seem to be imbued, it would soon change these kind and generous sentiments into feelings of spite,

insult, and revenge. Instead of being a boon of peace and a comfort to men of quiet and studious habits, it would degenerate into a state of continual warfare, and few men of science would like to spend their lives on such a field of battle.

To put an end to these remarks, I will only add that I think that when zoologists have long resided in a locality, and have made its productions the object of a particular study, such as Ruppell, Bleeker, Day, &c, their opinion is of greater value than that of a man, whatever may he his scientific acquirements, who remains in his study in Europe. A visit to a fish market, in bringing under your eyes thousands of specimens of a sort, will certainly lead you to a more correct idea of its variations than ean be obtained by the residing zoologist, who only has at his disposition one, or in all cases, a very few specimens, having lost their colours, and more or less their form, by dessication or preservation in spirits.

The study of Ichthyology has been with me, for many years, the object of a particular predilection. When in my youth, I spent nearly five years in the United States and Canada. I collected a considerable number of fishes on the demand of Baron Cuvier. Later, when I was the Director of the Scientific Expedition sent by the King of the French, Louis Philippe, to South America, I devoted much attention to this subject, and the specimens collected on my return, by the Amazonas River, are in the Parisian Museum; but the greatest part of the vast collection I had formed during the first three years overland, from Rio Janeiro to Lima, was lost. A few of the dried specimens were saved, but all those put in spirits were destroyed, probably by the liquor becoming too weak, and also by the other incidents inherent to a two or three years' trip on the backs of mules and horses. When the Relation of this Expedition was published, after a few years' delay caused by the political events which had agitated my country, I reserved for myself the Ichthyological part of the work. Having, after the Revolution of 1848, been appointed French Consul at Bahia, I continued my researches in the northern parts of Brazil, and I was enabled to insert the results I obtained, by reason of the delay I have just explained, in the Relation of my Expedition. Sent afterwards to the Cape of Good Hope, where I remained three years, during which

I travelled over Caffraria and several of the most remote parts of the Colony, I not only actively collected all the fishes I could observe, but I wrote detailed descriptions, and made drawings of every sort, with their natural colours; but, charged by my Government to establish a French Consulate at Siam, I extracted, before I left the Cape Colony, a short notice from my manuscript, and sent it for publication in June, 1858, to my late friend, Professor August Dumeril. Different circumstances delayed, during my absence, the printing of my "*Mémoire Sur les Poissons de L'Afrique Australe*," which only appeared at the beginning of 1861. It is in his seventh volume (1868) that Dr. Gunther quotes for the first time this publication, and does it in his usual style. I must say that I still believe that the study, during several years, of the fishes of a distant region cannot be entirely useless to science. In India, I continued my ichthyological labours. At Bangkock I collected the sorts of the great Mainam River; at Saigon, those of the Meklong; and, during a more or less lengthened stay at Malacca, Sumatra Java, Ceylon, and Singapore, I described and sketched from nature over 750 sorts. On my return to Europe, I began to put in order my voluminous notes, but having been obliged, on account of sickness, to interrupt my work, I was, on my recovery, struck with a most disagreeable surprise, in discovering that my servant had, for more than one month, used the sheets of paper on which I had bestowed so much time and labour to light the fires, and other parts of my learned lucubrations were discovered in the last place in the world where an author would be proud of finding his works. Totally disheartened, I disposed of my collection and drawings in favour of Professor Lacordaire, of the Liege University, another of my old friends, who has also lately been swept away before he could complete his great work on the Coleoptera Insects, and once more I devoted the whole of my time to Entomological researches.

I had always since my arrival in the Colony, nine years ago, been struck by the want of a work on the fishes of Australia, and of Victoria in particular. In such a new country, vernacular names are far from possessing the same degree of fixity as they do in Europe; and putting aside a dozen or two very common sorts, every fishmonger gives a different name to the same

species. This increases very much the difficulties of study, and I thought it would be useful to condense in a paper what was known on the fishes of the Colony. The Acclimatisation Society, always desirous of promoting anything useful to the country, entered into these views, and that is the origin of the essay I now submit to the public. Before I finish this paper, I think it is useful to say a few words on a subject which has always much embarassed naturalists, and on which the diversity of their views is very great: I mean the question of what is a genus ?—what is a species ?

A genus is, for me, a more or less artificial collection of species offering some common characters; a few appear to constitue natural groups; but I think that in such cases it will generally be found that the missing links have not yet been discovered, or have entirely disappeared from the recent *fauna* of the globe. The genus, being an artificial division, is, of course, appreciated very differently by the various authors. All the so-called superior divisions are in the same case, and thus the *species* seems to me to be, of the zoological divisions, the only one to be found in nature. But even this, to be such, must be considered as a *constant variety;* that is, that as soon as a collection of specimens present the same characters, due to natural circumstances, they must be considered as forming a species. I believe that accidental or Geological phenomena, in driving a part of the individuals of a species to regions different from those they previously inhabited, will, with time, constitute a new species, as it is certain that those individuals, having to find a different way of living, and to be subjected to different temperatures, will deviate from the type, and constitute different sorts, or what is usually called, when this process is only beginning, *local varieties*. Types will retain their forms unchanged thousands of years when they remain in the same climate and in the same region, but they will deviate as soon as these circumstances are changed. I have observed elsewhere (Expedition to the Central Parts of South America) that the animals who can neither fly nor swim are almost all different on one side of the Amazonas to what they are on the other, and this has been even observed by the wild men who inhabit these regions, the Indians having often told me that all the animals on the northern side are different from those of

the south. At the same time, the sorts are sometimes so nearly related as to make it certain that they once belonged to the same type. Still further, the large branches of that internal sea, such as the Madeira and the Negro, which are themselves mighty rivers, often produce the same zoological changes. This is particularly observable in the quadrumana and in the gallinaceous birds. The dispersion of the different sorts of *B achyurus* give a remarkable example of this fact. The immense range of the Andes has also produced similar effects, and sudden convulsions of nature, such as earthquakes, are known to have had the same consequences. By the same reason, the fresh-water fishes of the Amazonas and its mighty branches are, as a rule, of species different from those of the Parana and Paraguay, for all their head waters are sometimes only a mile or two distant one from the other; and if this rule presents exceptions, I consider that they are due to accidental inundations that may from time to time unite smaller branches of these mighty streams.

I submit these considerations with much humility, knowing with what animosity these questions are debated; but they are the result of a whole life spent in zoological investigations in all parts of the world. I have for many years studied nature in nature itself.

I cannot close these lines without expressing my best thanks to those who have assisted me. Sir Redmond Barry, to whom this Colony owes so much, granted me, by a most honourable exception, the loan of several Ichthyological books contained in the Public Library and missing in my own. Every naturalist knows that descriptions must be compared with specimens, and it is easy to understand how impossible it is to transport in a public establishment hundreds of preserved fishes which are often of large dimensions. I must also mention Professor McCoy, who did all in his power to assist me; Dr. Black and Mr Le Souef, the President and Secretary of the Acclimatisation Society, who are always ready to devote their time and experience to any undertaking they consider useful to the Colony; to Messrs. Livington Rooke, Morton Alport, and Waterhouse, who have most kindly sent me valuable specimens from Hobart Town and Adelaide; to Messrs. George Keesley

and Thomas Christy, who have sent me specimens from the Edwards River, Riverina. Several of the leading fishmongers have kindly assisted me; but even their influence has been of little avail with the fishermen.

At the Cape of Good Hope, fish forms the principal article of the food of the population, and the poorer classes live almost entirely on it, its price being lower than in almost all other civilised countries. In Australia, on the contrary, its very high price makes it an object of luxury, almost entirely reserved for the tables of the wealthy. Till this day very little has been done to provide Melbourne with an efficient supply of this useful commodity, and high prices making the demand very limited, the fishermen have little inducement to send large quantities to the market. It would be much to be desired that the Government of the Colony should make some attempts towards giving to the working-classes a sufficient supply of this wholesome article of food.

It was the intention of the Acclimatisation Society to publish with this paper illustrations representing the different sorts of fishes observed, till this day, in Victoria, and mentioned in this paper; but great difficulties have been encountered, and it has been resolved to postpone to a more favourable opportunity the execution of this project. It is to be hoped that these plates will be published in the next Annual Report, at the same time as a supplement containing notices of all the new sorts that will most likely be obtained in the course of the year.

I think it useful to give here the characters of all the families of fishes found up till this day in Australia. These are extracted from Dr. Gunther's work. I thought it better to compile this part than to attempt to convey the same ideas in different words, which could never have been done in such a concise and correct way. In doing so, I follow the example of the learned zoologist, Mr. Gerard Krefft. ("Industrial Progress of New South Wales, 1871.")

Subclass I. TELEOSTEI.

"Fishes with ossified skeleton and completely separated vertebræ; the posterior extremity of the vertebral column either long, or covered with bony plates. Bulb of the aorta simple, with two opposite valves at the origin; branchiæ free.

Order I. ACANTHOPTERYOII.

"Part of the rays of the dorsal, anal, and ventral fins not articulated, forming spines. The inferior pharyngeal bones separated. Air-bladder, if present, without pneumatic duct.

BERYCIDÆ.

"Form of body oblong or rather elevated, compressed; eyes lateral, large; cleft of mouth extending on the sides of the muzzle, more or less oblique; villiform teeth in both the jaws, and generally on the palate. Eight or four branchiostegals. Opercular bones more or less armed. Scales ctenoid, seldom bony, or wanting. Ventral fins thoracic, with more than five soft rays; in one genus with less. Cæca pylorica in increased number.

"Tropical and temperate seas."

I have till now found no sorts of this family in the Melbourne waters, but several inhabit the Australian seas, particularly in those that bathe the northern shores of the Continent.

PERCIDÆ.

"Body generally oblong, and covered with ctenoid scales; lateral line continuous. Mouth in front of the snout, with lateral cleft, rarely at the lower side. Eye lateral. All or some of the opercles serrated or armed. Seven or six branchiostegals. Dentition complete; teeth pointed, in villiform bands, with or without canines; teeth either on the vomer, or on the vomer and palatine bones. No barbels. Cheek not cuirassed. Dorsal fin formed by a spinous portion and by a soft; ventrals thoracic, with one spine and five soft rays. Stomach cæcal; pyloric appendages generally in small number. Swim-bladder present, simple. Intestines little folded.

" Carnivorous fishes, inhabiting the fresh waters and seas of all parts of the globe."

They are numerous in Australia, particularly those of the fresh waters.

LATES.

Genus formed by Cuvier on a sort found in the Nile. One or two have since been found in the mouths of the great rivers of India.

LATES COLONORUM.

Lates colonorum, *Gunther*, *Ann. Nat. History*, 1863, xi. 114.

(*Gipps Land Perch.*)

D. 8—1/10. C. 17. A. 3/8. P. 15. l. l. 53. l. tr. 8/17.

Body ovale, rather high; three times in total length; head three and one-third in the same; eye three and three-quarters in length of head, and equal to the snout; the lower jaw

longer than the upper one; mouth extensible; præoculer strongly serrated; posterior limb of the præoperculum finely serrated, and having a light notch towards the inferior angle, from which the spines become very strong, the lower ones in particular, which are directed with their points forwards. The operculum has two points, the lower much larger than the other. The dorsals are continuous, the first having its first spine rather short, the second about twice its length, the third about equal to twice the length of the second, the fourth the longest of all; the caudal is lightly emarginated. The spines of the anal are rather slender; the first is the shortest, and the third the longest; the lateral line extends to the base of the caudal.

The colour is of a dark green, becoming very light and greyish on the sides of the body, the lower parts of which are white. On the back, each scale has its centre of a bright silver colour, which shines like a diamond. Anterior parts of the head and mouth of a light purple; operculum with green and red tinges; fins of a yellowish grey; the spines purple; pectorals green. with the base more or less scarlet; eye of a bright orange yellow

This fish is very common in the lakes of Gipps Land, and is often brought in great numbers by the steamers to the Melbourne market in winter. Its flesh is soft, and not savory. Medium length, 12 inches.

LATES SIMILIS.

This fish is very nearly allied to the precedent; in fact, it is only by a very close examination that it can be distinguished from it. Its form and colours are similar, but the snout is shorter, and sensibly less than the diameter of the eye. The denticulations of the præoperculum are larger, and those of the lower limb are directed backwards. The second dorsal fin has only nine rays.

It is found with *L. colonorum*, but seems to be very scarce.

LATES ANTARCTICUS.

(*Sea Perch.*)

B. 7. D. 8—1/10. A. 3/8. C. 16. P. 14. l. l. about 55. L. lat. 8/16.

Height, three and one-tenth in total length; head three and two-thirds in same; eye five and one-twelfth in length of

head; and one and a-half in snout. General form oval, rather high. The upper parts of the head without scales; the lower jaw longer than the upper one; mouth extensible; præoperculum rather finely serrated; operculum equally serrated on its posterior edge, rounded at its angle; the spines becoming gradually stronger; those on the inferior edge larger, equal, and obliquely directed forward. In some specimens, the spines of the angle and the inferior ones are bifid, and there is sometimes an interval between them. The operculum is terminated by two spines; the lower one much longer than the other. The lateral line is sometimes rather sinuous. The first dorsal is formed of a first short spine, a second generally twice its length, a third much longer still, and the fourth the longest of all; the second dorsal has a rather strong and long spine, and the rays are large, the first being the longest, and the others decreasing as they extend backwards; caudal emarginated, with the lobes rather rounded; the anal with three rather slender spines, the first the shortest, and the third the longest; the rays have the same form as those of the anal; the spine of the ventrals is strong and short. The colour is silvery, with the back and upper parts of the head of a dark blue; dorsal and caudal blackish; ventrals and pectorals of a dark greenish grey; anal of a light grey.

This fish is not very common, and only appears now and then in the Melbourne market.

Nota.—The dried specimens are very much like those of *Lates Colonorum*, but the body is higher; the denticulations of the præorbital are proportionately finer, those of the præoperculum rather stronger on the posterior edge, and become longer in a more equal way. The colours are different, and the flesh of this sort is considered very savoury. It also becomes much larger, and generally attains about 16 inches.

LATES VICTORIÆ.

This sort is so very nearly allied to *Antarcticus* that I considered it, at first, as belonging to that species. It is only distinguished by the second spine of the operculum, which is formed of a bunch of spines, numbering four, and of which the two central ones are the largest. The lateral line has two very strong

sinuosities—one opposite to the beginning of the first dorsal, and the other to its end. The anal, also, has only eight soft rays. The body is very silvery, with the back of a light green, showing on the living specimen seven or eight longitudinal lines, of a rather darker tinge; the sides and belly have a rosy hue; the sides of the head are rather purple; the fins are of a purplish green; the eye yellow. Length, 16 inches.

APOGON.

This genus extends its *habitat* over all the warm and temperate seas of the globe. In America alone its sorts appear to be very scarce, and I was the first to describe one from Brazils; since then Dr. Gunther has made known another from the Pacific coast of South America. I have only observed one sort at Melbourne, and it appears to me not to have been previously described. It is certainly very distinct from Dr. Gunther's *Apogon Victoriæ*, which I have not yet seen.

APOGON GUNTHERI.

D. 7.—1/9. A. 1/7. P. 15. C. 21.

Upper profile very convex; body very thick; height contained a little over two and a-half times in total length; head about two and two-thirds in the same; eye very large, its diameter being one-third of the length of the head. Præoperculum with its first ridge entire, and the second rather strongly denticulated; operculum with two spines; scales large, ciliated on their external margin, numbering from 26 to 27 on the lateral line, and 11 or 12 on the transverse one. The spines of the first dorsal are as follow:—The first very short, the second more than twice its length, the third very large and very thick, arched, and at least double of the second—the following go on decreasing; the second dorsal has a strong, straight spine, followed by the soft rays, which are one-third longer; caudal rounded; anal with two spines—the first short and arched, the second more than twice its length, and straight; the soft rays like those of the dorsal; the spine of the ventrals strong; the pectorals rather large and rounded. The general colour is of a brownish pink, without spots or bands; the sides of the head have a golden tinge; the scales are covered with very minute black dots, except

on their edge; the fins are pink, with their extremity of a blackish purple; eye of a dark purple brown, with an internal golden ring. Some specimens have the throat inflated.

Found rather often on the Melbourne market in the cold months. Average length, 4 inches.

ENOPLOSUS.

This very pretty fish was first observed by White, who, in his travels in New South Wales, describes it under the name of *Chœtodon Armatus*. Lacepede founded on it the genus *Enoplosus*, but left it as a sub-division of *Chœtodon*. Cuvier (*Règne Animal*) easily saw that its only connection with that genus was due to the distribution of its colours, and put it in, at its right place, in his family of the *Percoidæ*. Later, in his "Natural History of Fishes," he gives a good figure of it, but the blue tinge it is coloured with is not in conformity with nature. He also represents the eighth spine as forming part of the first dorsal; but it is always free in the numerous specimens I have seen, and situated between the first dorsal and the second. Dr. Gunthar only counts seven spines to the first dorsal, and does not mention this isolated one.

I. ENOPLOSUS ARMATUS.

Chætodon armatus, *White* (*Travels in New South Wales*, pl. 39).

Enoplosus armatus, *Cuvier; Lacepede.*

(*Bastard Dorey Fish.*)

D. 7-1—1/14. A. 3/14. P. 13. C. 17.

Of a silvery white; back of a brownish black; head with two and body with five broad brown transverse bands; those of the body generally alterning broad and narrow. The large dorsals are of a dark purple brown, with the spines of a whitish purple, marbled with dark tinges; caudal yellow, with its base and sides brown; anal and ventrals of a brownish black; pectorals pink; the posterior parts of the second dorsal and anal are often of a yellowish white; eye of a bright yellow, well marked with the brown band that crosses the head.

This sort is commonly seen in the Melbourne market, and is rather esteemed as food. It never attains very large dimen-

sions. In the Australian winter the specimens are small, and do not measure more than from four to six inches; but in the warm months (December, January,) they are much larger, and some are nearly a foot long. The ground colour of those large specimens is of a fine reddish purple, and that of the fins red; the eye is yellow, with an external circle of an orange red. Those specimens were generally females, with well-developed eggs.

MICROPERCA.

Teeth numerous and sharp, disposed in several rows on both of the jaws and also on the palatines; no canines; tongue smooth; operculum and præoperculum not serrated, entire; the latter with two feeble points, of which the lower one is much larger than the other; the præorbital very finely serrated; two dorsals, slightly continuous—the first triangular, with eight spines; caudal rounded; anal with three spines; scales large. Form oval, rather high; head attenuated; body compressed; no scales on the upper part of the head nor on the snout.

This genus is nearly allied to *Psammoperca;* but the præoperculum without spines, and the absence of a scaly sheath at the dorsals, oblige me to separate it. Its general form is very similar to fig. 1 of pl. 57 of the fishes, *Erebus and Terror.*

MICROPERCA YARRÆ.

Height three times and a quarter in the total length; head four and one-fifth times in the same; eye four and a quarter in the length of the head. There are about 29 scales on the lateral line, and 12 on the transverse one; the first dorsal is situated rather backwards; it is formed of eight very strong spines—the first short, the second and third the longest, and nearly equal, the others becoming gradually shorter; the second dorsal has one long and straight spine, and eight soft rays; these go on increasing in length; the caudal has 17 rays; the anal has the same form as the second dorsal; its spines are strong; the first is short; the pectorals are small, and have 14 rays; the scales are large, rounded, and rather ciliated on their edge; the operculums are covered with similar but rather smaller scales; the mouth is rather protractile. The colours are subject to many variations; in some, the back is of a purple grey, and the

belly and fins yellow; the centre of the scales is generally dark. In other specimens the back is green, and the belly white, with a black longitudinal spot on its lower part; the fins of an orange colour, bordered with black; the ventrals entirely of that colour; the body has more or less black spots; the eye is silvery.

This pretty little fish is found in the lower Yarra, where the water is brackish. Most of my specimens were obtained in Captain Sinnott's dock. The general length is about $2\frac{1}{2}$ inches, but I have one which measures a little over 3.

CÆSIOPERCA.

Serranus, *Rich.;* anthias, *Gunther.*

The very pretty fish on which I propose forming this new genus is, in general form, very much like *Arripis*, and might at first sight be taken for a *Cæsio*. By its operculum and præoperculum being denticulated, and its palatines being armed with teeth, it must be placed with the *Percidæ;* but even the beauty and disposition of its colours convey the idea of a *Cæsio*. It would have been a *Centropristes* for Cuvier, if its head was not entirely covered with scales. Teeth very numerous, villiform, those of the inner row directed backwards; two very blunt and small canines on each jaw; a few sharp, arched teeth, larger than the others, on each side of the lower jaw; teeth on the palatine bones, disposed in a transverse line, in three groups; fins in their greatest part covered with small scales; one dorsal; operculum with two spines—the upper small, the other larger; dorsal with ten spines, and anal with three; all the parts of the head entirely covered with scales; those of the body moderate or rather large.

Dr. Gunther, in leaving provisionally this sort with his *Anthias*, states that it will probably form the type of a separate genus.

CÆSIOPERCA RASOR.

Serranus Rasor, *Rich.; Proceed. Zool. Society*, 1839, p. 95; *Trans. Zol. Soc.*, 1849, pl. 4, fig. 1.

Anthias Rasor, *Gunther; Catalogue* 1, p. 93.

D. 10—19/20. C. 15. A. 3/9. P. 13.

Height three and one-third in total length; head three and a half in the same; eye four times in the length

of the head. L. lat. 56. L. tr. 5/18. Body oval, rather elongated ; pectorals large, having about the fourth of the total length of the fish ; caudal forked. The denticulations of the præoperculum very fine on its outer edge, but becoming much larger towards the angle ; the lower edge is also crenulated. The operculum is only distinctly denticulated on its inferior part ; præorbital strongly ciliated. The lateral line follows the curve of the back at about one-fifth of the height of the body. Scales rather large, and strongly ciliated on their external edge. The dorsal fin is covered with small scales to nearly two-thirds of its height ; the spines number ten, and are rather strong ; the first is the shortest, being about two-thirds the length of the second ; this is rather shorter than the third ; the fourth is the longest ; but all the following are very nearly equal to it. The soft rays form an exact continuation to the spines, but they are longer than the last of these, and go on increasing in length towards the posterior angle, which is rounded. Not only do the scales in this second part of the fin extend entirely over the lower part, but they do also on the membranes to nearly their end. The caudal fin is very strongly emarginated ; its rays are covered by the scales to much more than their first half; the anal spines are slender ; the first is nearly two-thirds of the second, which is a little longer than the third ; the rays are rather long ; the posterior angle of the fin is rounded : small scales cover the almost totality of the membranes. Ventrals of moderate size ; their spine rather slender and straight ; the first ray is the longest, and the others become gradually shorter.

The body is of a pretty, light brown colour ; the back of a purplish light blue, with several rather broad, yellow, gilt longitudinal bands ; the two upper ones are irregular, and disappear a short time after the death of the fish ; the lower, which follows the lateral line, is more consistent, and extends from the end of the operculum to the centre of the base of the caudal. These bands extend over the sides of the head, and one in front of the eye. Each of the scales of the body has its edge of a light blue colour, and between the series of scales are very light yellow longitudinal lines. In the centre of the body, and in part covered by the extremity of the pectoral fin, is a black spot of a lozenge form, which covers, in its broadest part, three series of longitudinal

scales and the same number of transverse ones. The dorsal has its scaly part of a light purple, and its extremity yellow; the caudal is of a light blue, with rather transverse yellow spots; the anal is also of a light blue, with the external part yellow, and numerous spots of the latter colour all over it; its extreme edge is red; the pectorals are of a brownish red, and the ventrals pink; eye yellow.

I have only seen one specimen of this sort, which was caught at Western Port in the first days of December.

The *Anthias Richardsonü* (Gunther, Proceedings Zoological Society, 1869, p. 429,) appears to me to be a simple variety of this fish, the only difference being that the black spot is situated a little further back than in *Rasor*.

ARRIPIS.

This genus was formed by Jenyns, in the "Zoology of the Beagle (1842)," on a sort of *Centropristes*, described by Cuvier and Valenciennes; but in 1847, Mr. Brisaut de Barneville published it again, under the name of *Homodon*. ("Revue Zool. de Guérin.")

Cuvier and Valenciennes describe, in their great work, three sorts, one of which (*Truttaceus*) they believe to be the *Perca Trutta* of Forster, and already described by themselves under that name in their second volume. Professor McCoy, in his "Notes on the Zoology of Victoria" (Intercolonial Exhibition, 1866), was the first to mention that two of Cuvier's sorts were only the the young and the adult of the same species, but I think that that learned naturalist is mistaken when he says that the *Centropristes georgianus*, C. & V.; *C. Salar*, Richard; *C. Truttaceus*, C. & V.; and *Perca marginata* of the same, belong all to one species, and also when he says that the *arripis georgianus* is the *Salmon trout* of the Melbourne fishermen; this sort is their *Roughfy*. Their *salmon trout* is the *Centropristes truttaceus*, of which the adult is the *salmon* or *Centr. salar*. For what is of Forster's *Perca Trutta*, as that traveller, who found it on the coast of New Zealand, says that it is spotted with red, I think it very doubtful that it corresponds with any of the known Australian sorts.

The synonimy, thus rectified, will be as follows :—

ARRIPIS GEORGIANUS.

Centropristes georgianus, *Cuv. & Val.*, vii. 451.
Arripis georgianus, *Richard.; Gunther; Jenyns.*

(The Roughfy.)

There can be no doubt about this determination, as Cuvier says that this sort has fourteen soft rays at the dorsal. The numbers are :—

D. 9/14. A. 3/10. C. 17. P. 15

Grey on the back; the other parts silvery; slight and rather irregular transverse gilt bands, which become dark on the upper part of the body; dorsal of a dirty yellow, with upper edge obscure; pectorals grey; ventrals and anale white; eye yellow.

The very fresh specimens have a general gilt tinge, and the back green. I have seen during the hot months (December and January) several specimens entirely of an uniform colour, without spots.

This sort is very common all the year round, and always remains small. When not fresh it is often poisonous; it is easily recognised by the roughness of its surface, caused by its scales being strongly ciliated. The mouth is very extensible.

ARRIPIS TRUTTACEUS.

Centropristes ? truttaceus, *C. & V.*, iii. 50.
——————— salar, *Richard* (*Voy. Erebus and Terror*, p. 29, pl. 20).
——————— tasmanicus, *Homb. & Jacquinot* (*Voyage de Durville*, p. 40, pl. 4).
Arripis salar and truttaceus, *Gunther* (*Catal. Brit. Mus.*, 1, p. 253-254).

(*Salmon and Salmon-Trout.*)

D. 9/16-17. A. 3/10. P. 17. C. 17.

The adult fish is the *salmon* of the Australian fishermen, and their *salmon-trout* is the young. Its height is contained four and two-

third times in its total length ; the head is three and three-fourth in the same ; the eye five and one-third in the length of the head.

It is of a greenish lead colour, with the upper part of the head of a brilliant black ; on the upper half of the body are numerous and irregular black spots. The operculum and the end of the pectorals are usually tinged with yellow. Its length is sometimes over 22 inches. This is the *arripis salar* of Richardson and Gunther.

The young specimens are the true *centr. truttaceus* of Cuvier ; they are of an olive green on the upper parts ; sides and lower parts of a silvery white. On the sides and upper surface extend three or four longitudinal lines of rather large, rounded, and golden spots numbering from 14 to 19 on each line. Dorsal transparent, bordered with black ; caudal yellow, with its terminal part black ; anal white, as are also the ventrals ; pectorals yellow ; the sides of the head and the eye of a bright yellow.

This is one of the most common of all Victorian fishes. The young only take the adult livery, when they are at least one foot long. During the cold months of the year, the adults are hardly ever seen, but they become common in the Australian summer. When not very fresh, this sort is also very dangerous ; and, as Professor McCoy states, almost all the cases of fish poisoning are caused by it.

The genus *Arripis* is one of those curious beings who seem to have been created by Nature to puzzle the systematic zoologist. By its palatine teeth, it belongs to the *Percoïd* family ; but its general form would otherwise cause it to be placed near or with *Cæsio*. The general appearance of the adult *truttaceus* is that of a *scomberoïd*, of which it has even the colours, but the young has the same *Cæsio* appearance I have just mentioned. The præoperculum is more radiated than serrated.

OLIGORUS.

This genus has been formed by Dr. Gunther on a species of *grystes* of Cuvier ; but he adds to it a large New Zealand fish, evidently very different, and it ought to be characterised by having an operculum with a simple, smooth ridge.

OLIGORUS MACQUARIENSIS.

Grystes macquariensis, *Cuv. & Val.*, *Richard.*
———- brisbanii, *Les.* (*Voy. de la Coquille*).
———- peelii, *Mitchell* (*Exped. Austral.*)

(*Murray Cod.*)

This fish is very plentiful in the Murray and in most of the rivers of New South Wales. The young ones are much more slender and elongated than the adult or old ones. It attains to a very large size, and is frequently over two feet long. I have seen one about three and a-half feet, and which was said to weigh over one hundred pounds.

Blandowski says that the *Murray Cod* forms the principal article of food of the natives who reside on the banks of the interior rivers. In winter, when the rivers overflow their banks, the natives spear them at night by fire light, while they are sleeping behind old logs. In the warm season, when the rivers are low or cease altogether to run, they spear them very easily. To do this they dive, head foremost, to the bottom of the river. It has been introduced into the Yarra by the Acclimatisation Society.

I find in all the authors that the dorsal fin is formed of fourteen soft rays; but this is not the case with any of the numerous specimens I have examined, and I find that some have fifteen, but most sixteen. Their colour is subject to considerable variations; it is generally of a dirty yellow green, becoming white on the belly; the upper parts covered with small, numerous, and irregular dark green spots, which often take the appearance of very irregular transverse lines. On the sides of the head and of the the operculum these lines are frequently well defined, and longitudinal. The fins are purple, with more or less of a scarlet hue.

The fishermen of the Murray and Goulburn, where this sort is very plentiful, send it to Echuca, from whence it is put alive into baskets. In dying by asphyxia, the body often becomes, in parts, of a splendid scarlet, and sometimes this tinge shows the impression of the wickers of which the baskets are made; this is particularly the case with those specimens which are on the bottom of the baskets.

Mr. Wilson has tried to naturalize the Murray Cod in the rivers of the Wimmera, but I believe without result. The Acclimatisation Society has been more successful in its endeavours to place it in the Yarra, and it seems to have considerably propagated in that river; for, although no large specimens have yet been found, small ones are seen rather frequently. The fish seem to go down towards the sea, as Captain Sinnott most kindly sent me a small specimen he caught in his dock, where the water is already brackish. It is a little less than three inches in length; its colour is of a light grey, and the upper part of the body is covered with small black spots; the dorsal and the base of the caudal are yellowish, and the extremity of the caudal rather dark.

The Murray Cod, as almost all the Australian fresh-water fish, is often marked with red spots, caused by intestinal worms.

Nota.—A young specimen, obtained in January, 1872, and measuring six inches long, presented the following dimensions:—Height four times and two-thirds in total length; head three and one-third in the same; eye four and one-half in length of head. It was of a light lilac on the back, with the lower parts of a dirty white. On the sides and on the back were numerous irregular blotches of a dark purple.

DULES.

This genus was established by Cuvier and Valenciennes. The Australian sorts inhabit the rivers of the interior.

DULES AURATUS.

(*Murray Golden Perch.*)

D. 10/11. A. $\frac{3}{8}$. P. 15. C. 17. L. l. 76 (and 5 on Caudal). L. lat. 13/28.

Height three times and one-half in total length; head three and five-tenths in same; eye five and two-thirds in the length of the head; and one and a-half in length of snout. Head cavernous; teeth on the palatines; upper profile strongly convex on the back, the snout being elongate. Præorbital long, striated, and finely serrated. Head covered with scales, except on its upper surface; lower jaw longer than the upper one; præoperculum straight and equally serrated posteriorly, rounded and covered

with much larger spines on its lower margin; these spines are flat, and separated in different series, those nearest to the mouth being directed forwards. The operculum is only and feebly serrated in its lower portion; it is ended posteriorly by two rather long spines, the first always simple, and the second the longest, and sometimes bifid. The suprascapula and caracoïd finely serrated.

The scales of the body small, and finely ciliated; the dorsal spines strong; the first being very short, and the fifth the longest of all; the soft portion of the dorsal much higher than the spiny one with its membranes covered to more than one-third of their length with minute scales; caudal rounded; the spines of the anal very strong, the second by far the strongest of the three; ventrals with a strong, straight spine; their first ray prolongated and bifid.

When fresh, this fish is adorned with most beautiful colours. The body is of a magnificent green; the sides are golden, as is also the upper portion of the body behind the dorsal. The head presents a beautiful mixture of green, purple, yellow, and scarlet, with fine golden tinges; the belly is white; the dorsal fin is of a purple green; the anal scarlet, with its base yellow and its end purple; the pectorals are scarlet at their base, and yellow in their second half; the eye is purple, with an interior white ring. These colours are subject to great variations, and the belly is sometimes red.

The young fish is much more elongate than the adult, and has little of the fine hues of the latter. The back is green, with the sides and belly yellow; the upper part of the head and the operculum are purple; the dorsal is grey, with its soft portion bordered with black; the caudal and anal similar; the spines of the latter are pink; the pectorals and ventrals are yellow.

This sort is much esteemed for the table. It often weighs five and sometimes seven pounds. It appears to be common in the Murray and in the other rivers of Riverina. I am in great doubt if it is not the *Dules Ambiguus* of Richardson and Gunther; but the numerous specimens I have examined have all one ray less at the anal, and also less scales on the lateral line. In Richardson's figure (*Erebus* and *Terror*, pl. xix.,) the lower præopercular spines are also much smaller and more regular.

DULES CHRISTYI.

D. 10—11 ? C. 17. A. $\frac{3}{8}$.

Height three times and one-fourth in total length; head four and one-sixth times in the same; orbit four and one-half in the length of the head, the latter very cavernous. The superior profile is very much elevated, almost gibbous behind the eye. The highest part of the body is at the base of the pectorals. The præoperculum is straight, finely and equally denticulated behind, with its angle rounded and slightly protuberant; the denticulations become gradually rather stronger in this part, and on the inferior edge they are still stronger, and present one or two interruptions. The operculum terminates with two flat, broad, serrated appendices, placed somewhat obliquely; the caracoïd presents a long series of denticulations. The teeth are very numerous, villiform; the vomer bears some teeth, but none are visible on the palatines; the lateral line follows the profile of the back; it runs over fifty-two series of scales; the transverse line numbers eight above it, and eighteen below. These scales are rather large, and ciliated on their edge. The dorsal is formed of ten spines, the fourth being the longest, and the first only about one-half of the second. I cannot ascertain with certainty the number of the soft rays, my specimen being deficient in this part. The caudal is rounded; the anal has three spines, of which the second is the longest. On the soft part of the dorsal, on the anal, and on the caudal, numerous scales are seen on the membranes, up to about one-third of their length. The spine of the ventrals is strong; the pectorals have about two-thirds the length of the head.

The upper parts of the body are of a brownish purple, and the lower white. The only specimen I have seen was kindly sent to me by Mr. Thomas Christy, from the Edwards River, near Deniliquin. It measured 14 inches long; when I received it, it had been some time preserved in salt, and I could not form a very good idea of its original colours. It is so much like *Murrayia Cyprinoïdes* in form that I should have thought it belonged to the same species, had it not been for the difference in the number of the spines of its first dorsal.

PRISTIPOMATIDÆ.

"Body compressed and oblong, covered with scales, the serrature of which is sometimes exceedingly fine and sometimes wanting. Lateral line continuous, not continued on the caudal fin. Mouth in front of the snout, with lateral cleft. Eye lateral, of moderate size. Five, six, or seven branchiostegals. Teeth in villiform bands, with pointed and conical canines in some of the genera; no molars or trenchant teeth in the jaws, generally no teeth on the palate; jaws toothless in two of the genera. No barbels. Cheek not cuirassed. One dorsal fin, formed by a spinous and soft portion of nearly equal development, the former of which either contains strong spines or is continuous with the latter; anal similarly developed as the soft dorsal; the lower rays of the pectorals branched; ventrals thoracic, with one spine and five soft rays. The bones of the head with a rudimentary or moderately developed muciferous system. Stomach cæcal; pyloric appendages in small or moderate number. Air-bladder present, more or less simple. Pseudobranchiæ well developed.

"Carnivorous fishes, without molar or trenchant teeth, inhabiting the seas of the temperate and tropical regions; a few entering fresh waters."

Those of Australia that I have to mention here are all from the rivers. They are very nearly allied to the sorts of *Dules* I have already described.

THERAPON NIGER.

(*Murray Black Perch.*)

D. 12/12. A. $\frac{3}{3}$. C. 17. P. 15. L. lat. 89. L. tr. 14/28.

Height of the body three and one-half times in the total length; head four and two-thirds in the same; eye four and one-third in the length of head. Superior profile considerably arched, much more so than the lower one; upper surface of the head naked, the other parts covered with scales; præorbital strongly denticulated; præoperculum with its posterior edge rather emarginated, and covered with very strong spines, particularly long on the rounded part, and becoming much smaller on the lower edge, where they are reduced to small denticulations; operculum terminated by two bunches of flat spines, the first of two and the second of six; the suprascapula and the caracoïd are very strongly denticulated. The lateral line is very irregularly formed, passing sometimes in the centre and sometimes on the edge of the scales; the numbers we have mentioned only relate to the numbers of transverse series it crosses; it does also extend on the base of the caudal. The dorsal is received in a longitudinal sulcate of the back; its spines are strong; the three first are shorter than the others; the membranes of the soft part have each a longitudinal patch of scales placed near the rays, and extending to more than one-third of the height of the fin. The caudal is emarginated; it is covered at its base with scales of the same nature as those of the body, and others, much more minute, cover the membranes on all their first half. Anal with its spine large and striated; the spine of the ventrals strong, striated, and longer than the half of the length of the fin.

The back is grey, but appears dark on account of all the scales having a rather broad, black margin; the lower part of the body is of a dirty, yellowish white; the fins are grey; the posterior part of the caudal black.

From the Murray River, but scarce. Length of specimen, $16\frac{1}{2}$ inches. This sort must be nearly allied to the *Therapon Unicolor* of Gunther (*Catalogue*).

THERAPON RICHARDSONI.

(Murray Silver Perch.)

D. 12/11-12. A. $\frac{3}{8}$. C. 17. P. 16. L. l. about 65.
L. lat. 17/25.

Height of the body three times and eight-tenths in the total length (to the central end of the caudal) ; head four and two-thirds in the same length ; the eye four and one-seventh in the length of the head. The superior profile strongly convex, and rather equally arched ; the inferior almost straight ; general form elongate ; no teeth to the palate ; præorbital very strongly serrated ; the præoperculum rounded, and armed with a series of long spines posteriorly, and of shorter ones below. The caracoïd is strongly serrated at its posterior margin ; the operculum has two spines, the lowest being the strongest. The upper part of the head is naked, the rest scaly. The dorsal is received in a longitudinal cavity of the back ; its fifth spine is longer than the precedents ; the lateral line extends considerably on the base of the caudal, which is also covered with scales. The caudal is slightly emarginate ; the spines of the anal are very strong, particularly the second.

This species seems very nearly allied to *Therapon Ellipticus*, Richardson (*Datnia*); but the number of the scales given by Dr. Gunther seem very different. (L. lat. 85. L. trans. 17/31.) Richardson's figure shows only about 52, which might agree with our sort ; but he mentions nothing about them in his text (*Erebus and Terror*).

This fish is very often brought to Melbourne from the Murray. I have also a specimen from the neighborhood of Deniliquin ; but the lower point of its operculum is flat and bifurcated ; this may be accidental.

The general colour is of a greyish blue. The lower parts of the body are of a dirty white : the sides shaded with yellow ; each scale is bordered with black ; the head has a blueish tinge, with the lips and the lower parts of the head rosy ; eye yellow ; the first dorsal is dark, with the rays purple ; the second has its lower half of a dirty yellow, and its exterior one black ;

the caudal is of the latter colour ; anal dark, with the rays purple ; ventrals white, with the rays rosy ; pectorals yellow at the base, and black on their interior half. Average length, 11 inches, but some are much larger.

MURRAYIA.

This new genus comes between *Dules* and *Therapon*.

The dorsal has eleven spines ; the operculum is denticulated in all its length ; there is a line of small teeth on the palatines, and the caudal is rounded. Scales minutely serrated; head cavernous.

These fish inhabit the rivers of Riverina, and particularly the Murray, and are brought to the Melbourne market by the Echuca Railway. They are all considered good for the table, and are generally sold under the name of Murray Perch.

This genus must be very nearly allied to *Macquaria*, but the latter has no teeth in the jaws. I expect that the *Dules Viverrinus*, Krefft, "Proceedings Zoological Society, 1867," which I have not seen, belongs to this genus, as it has eleven spines at the dorsal ; it also comes from the Murray.

MURRAYIA GUNTHERI.

D 11/12. A. $\frac{3}{8}$. P. 16. C. 16. L. lat. 50 (and 5 on the Caudal). L. tr. $10\frac{1}{2}/18\frac{1}{2}$.

Height three and one-half times in length ; head three and two-thirds in same ; eye four and one-half in the length of the head. Upper profile very convex, the back being very much elevated behind the head, and almost gibbous ; lower profile much more regularly curved ; upper surface of the head naked ; the other parts covered with scales. Præorbital very finely denticulated ; præoperculum with its posterior margin rather emarginated, and finely serrated ; at its rounded part, these denticulations become much larger, and extend so on all the inferior margin. They present several small spaces devoid of them—one before the angle, one below it, and a few others on the lower edge. Operculum terminated by two very broad, flat, oblique appendices these are strongly serrated, and the space between them is very small ; all the posterior margin is finely serrated ; the superscapula and the caracoïd are also serrated. The lateral line is

formed of a succession of small longitudinal ridges, extending on the middle of the scales; it extends on the caudal. The dorsal fin is large; its fifth spine is the longest; the membranes of the second portion are covered with scales to the fourth of the height of the fin. The caudal is rounded, and its membranes are covered with scales nearly up to the middle of their length; the anal is long, with its spines strong; the second is much longer than the first, and a little more so than the third; it is covered with scales at its base, as are also the pectorals. The ventrals are large, their first ray is prolongated in a filament, having about the fifth of the length of the fin; the spine is strong, and nearly two-thirds of the length of the rays.

The general colour is purple, becoming reddish on the lower parts. The upper surface of the head is green, and the sides of a rather brilliant purple; the lips and internal circle of the eye are of a flesh colour; all the scales of the body are bordered with a dark tinge; the dorsal fin is of a purplish green, with the spines purple; the caudal and anal purple; the ventrals are pink, with their external third black; the spine is purple; the pectorals yellow; eye brown.

From the Murray River; average length, 14 inches.

Nota.—I have a monstrous specimen of this sort which has an accidental spine on the left side of the third dorsal. The eye is red.

The smaller specimens are more elongate than the adult.

In one specimen, the soft rays of the dorsal number thirteen; in another those of the anal nine. I have received from Deniliquin, by Mr. Christy, a monstrous specimen of this sort, in which the ventrals are rudimentary, and only formed of one distorted spine and three rays. The second spine of the anal is also quite distorted, and there are eleven soft rays to the anal.

MURRAYIA CYPRINOIDES.

(*Murray Carp.*)

D. 11/13. A. 3/9. C. 17. P. 16. L. lat. 52. L. tr. $10\frac{1}{2}/18\frac{1}{2}$.

Height of body three and one-third times in total length; head three and one-half in the same; eye five and a-half times in the length of the head.

Very much like the two precedents, but the body much highe and more gibbous on the back than even in *Guntheri*. The first ventral ray prolongated in a bifid filament.

The upper part of the body is green, with the border of the scales darker; lower parts of the body yellow; the lateral line dark; sides of the head purple; upper part of the pectorals pink, with their lower portion yellow. The dorsal, caudal, and anal are purple; the ventrals pink, with the spine white.

Sometimes common in the market, from ten to twelve inches long. From the Murray.

MURRAYIA BRAMOIDES.

(*Murray Bream.*)

D. 11/12. A. $\frac{3}{8}$. C. 17. P. 16. L. l. 52. L. tr. $9\frac{1}{2}/16\frac{1}{2}$.

Height four times in total length; head three and two-thirds in same; orbit three and eight-tenths in length of head. The body is rather short, similar to *Guntheri*. Head very cavernous; præoperculum straight on its back edge, and finely ciliated and serrulated. On the posterior angle, which is rounded, the denticulations become larger and blunt; those on the lower margin are directed forwards; there are several spaces devoid of denticulations between them. The inner edge of the operculum produces towards its angle a sort of rounded flap. The operculum is thinly serrated, and has two angles, the lower of which is a sort of flap divided into five flat spines. The præorbital is not strongly denticulated; the suprascapula is like a segment of a little round saw. The lateral line extends on the root of the caudal. The base of the spines is scaly; the longest spine of the dorsal is the fifth; the others grow shorter as they go backwards; the first is very small, the second longer, the third twice as long as the precedents, the fourth about one-third longer again, and not much shorter than the following. The spines of the anal are rather slender—the first much shorter than the others, the second being the longest; the spine of the ventrals is long, and rather slender; the first soft ray of the same fin is prolonged on a filament.

The general colour is of a dirty yellow. Each scale has an obscure border; head brown, with the lower parts reddish; fins

dark, with the spines purple; pectorals and ventrals pink; eye yellow.

Scarce; Murray River. Average length, from 10 to 12 inches.

RIVERINA.

This genus is very nearly allied by its form to *Murrayia*, but the dorsal has twelve spines; no teeth on the palate.

RIVERINA FLUVIATILIS.

D. 12/11. A. 3/8. C. 18. P. 16. L. lat. 46, and 5 on the Caudal. L. tr. $8\frac{1}{2}/16\frac{1}{2}$.

Height three and two-thirds in total length; the head three and six-tenths in the same. General form very much like *Murrayia Bramoides*. Posterior limb of the præoperculum straight, and finely serrated, the denticulations becoming much larger towards the angle and on the inferior edge. The two spines of the operculum are, the first bifid, and the second tridenticulated; the dorsal has its fifth spine sensibly longer than all the others; the twelfth is longer than the preceding one. The first anal spine is small; the second very thick, but not longer than the third, and blunt. The first ray of the pectorals prolongated in a rather long filament.

Same colours as *Murrayia Bramoides*, but the head of a more fleshy colour.

Murray. I have only seen one specimen.

MULLIDÆ.

"Body elongate, slightly compressed, covered with large scales, without or with an extremely fine serrature. Profile of the head more or less parabolic; hyal apparatus with two long barbels. Lateral line continuous. Mouth in front of the snout, with the cleft lateral and rather small. Eye lateral, of moderate size. Four branchiostegals; pseudobranchiæ. Dentition feeble, more or less

complete. Two dorsal fins, remote from each other; anal similar to the second dorsal; ventrals with one spine and five rays. Air-bladder, if present, simple and of variable size; stomach siphonal.

"Inhabitants of nearly all the tropical seas, extending in Europe on to the coasts of the temperate region. Some species entering rivers."

UPENEICHTHYS.

Separated by Dr. Bleeker from *Upeneus*, on account of teeth being present on the vomer bones; but none on the palatine. One single sort known.

UPENEICHTHYS POROSUS.

Upeneus porosus, *Cuv. & Val.*, v. iii. p. 455.

(*The Red Gurnet.*)

The colours are subject to much variation. In some the back is of a brownish purple; belly white, with some carmine blotches; a black longitudinal band on the side, which is broader behind, and does not generally attain the head. On the sides of the latter are two narrow and arched blue lines, which extend from the eye downwards. The fins are brown, marbled with light green; the spines purple; the anal, pectorals, and ventrals pink; the edge of the latter and the rays of the anal orange; barbels yellow; eye of the same colour, with an external circle orange. In other specimens the colours are lighter, and the back is grey. The adults are a foot long, and are entirely of a beautiful carmine colour, but they always have the black lateral streak and the blue lines of the head.

It is not very common, but considered one of the best table fishes.

SPARIDÆ.

"Body compressed and oblong, covered with scales, the serrature of which is exceedingly minute, and sometimes wanting. Tail not armed. Lateral line continuous, not continued on the caudal fin. Mouth in front of the snout, with lateral cleft. Eye lateral, of moderate size. Five, six or seven branchiostegals. Either trenchant teeth in front of the jaws, or lateral series of molar teeth; generally no teeth on the palate. One dorsal fin, formed by a spinous and soft portion of nearly equal development; anal with three spines; the lower rays of the pectorals generally branched, in one group simple; ventrals thoracic, with one spine and five rays. The bones of the head with a rudimentary muciferous system. Air-bladder present, often bifid posteriorly. Pseudobranchiæ well developed.

"Herbi- and carnivorous fishes, inhabiting the seas of the temperate and tropical regions; a few entering rivers."

MELANICHTHYS.

Temminck and Schlegel formed this genus, in their "Fauna Japonica," on a fish which had been described by Gray, under the name of *Girella;* but this latter had been used by Cuvier as the French name for *Julis*, and, for all it has been adopted by Dr. Gunther, I thought it was better to adopt the other to avoid the confusion that might otherwise result. The Australian sorts were first noticed by Richardson, who placed them with *Crenidens*.

The præoperculum is covered with scales, but the operculum is without any, except at its upper angle.

MELANICHTHYS TRICUSPIDATA.

Box tricuspidata, *Quoy et Gaim. Voy. de Freycinet Zool.*, p. 296.

Oblata tricuspidata, *Cuv. & Val.*, vii., p. 372.

Girella tricuspidata? *Gunther, Catal. Brit. Mus.*, v. 1, p. 428

Crenidens triglyphus? *Richardson, Erebus and Terror, Fishes*, p. 36, pl. 25, fig. 2.

(*Rock or Black Perch.*)

Almost black on the upper parts; grey on the sides, and white below. On the anterior part of the head, and even on the operculum, there is a yellow tinge. Dorsal fin of an obscure olive grey, with the lower two-thirds of a dark red. Caudal obscure; anal of a dark green, with the spines white; ventrals of a dirty white; pectorals sometimes of a light colour, and sometimes with their external half obscure; eye yellow.

The fish that I consider to be Dr. Gunther's *Tricuspis* agrees much better with Richardson's figure of *Tephrœops*, only the scales are not small, but of moderate size. They number 57 on the longitudinal line, and about 38 on the transverse one, of these 13 are above the lateral line. It is next to impossible to count with absolute certainty the very small ones of the extreme lower parts of the body.

The dorsal has 15 spines and 13 soft rays; the caudal has 15 long rays and 4 shorter ones on each side; the anal has 3 spines, of which the first is very small, and the others nearly equal; the rays number 11; the pectorals have 16 rays.

Specimens of this sort sometimes show nine or ten very narrow, transverse, obscure bands. In the warm months, the colour of this fish seems to become much lighter; and in December, I have seen many specimens almost white.

The teeth are very singular, being each three-lobed on the edge. These teeth form a continued series, but over them is another rather irregular and spaced one. In the inside of the mouth, these large teeth are succeeded by a deep groove, behind which are numerous rows of others, much smaller.

The *Black Perch* is esteemed as an article of food.

The usual size of this sort is from 12 to 15 inches long, but some specimens weigh up to six pounds and over.

I am not certain that *Girella Zonata*, Gunther ("Catal. Brit. Mus.," p. 429), is not one of the striped varieties.

MELANICHTHYS SIMPLEX. ?

Crenidens simplex? *Richard., Erebus and Terror, Fishes*, p. 120.

Girella simplex? *Gunther, Catal. Brit. Mus.*, p. 429.

This sort is entirely similar to the preceding in general appearance, and is confounded with it by the fishermen and fishmongers. Its only difference consists in its teeth, which are more irregular, and without any denticulations or lobes at their edge. I thought for some time that these were old specimens, whose teeth had been worn; but they are generally smaller than the specimens of *Triscuspidata*, still I very much doubt their forming a distinct species.

NOTA.—Dr. Gunther, in the second volume (1863) of the "Annals and Magazine of Natural History," p. 115, proposes a genus *Melambaphes*, to contain a Victorian fish, which is said to be the *Glyphisodon nigroris* of Cuvier and Valenciennes, but it is impossible for me to recognise this last sort. *Glyphisodon nigroris* was established on a specimen brought from Holland, and having been in the cabinet of the Stadtholder; its locality is unknown, but it is almost certainly from the Dutch East Indies, as were almost all the sorts coming from that Museum. The very few descriptive words given by the French ichthyologists do not permit to apply them in particular to any Australian species. Dr. Gunther adds that this sort is the *Black Perch* of the colonists (which is the fish I have just described), but there can be no doubt that this is Richardson's sort, and it cannot be Dr. Gunther's species, as he says that it has the cheeks and opercles covered with very small scales.

NEOTEPHRŒOPS.

Melanichthys or *Girella* is distinguished by its operculum without scales and the moderately-sized scales of its body; *Tephrœops* has also the same operculum, but its scales are very small. The new genus I propose, has the general form and small scales of the latter, but the operculum and præoperculum are covered with scales. The teeth are tri-lobed on the edge, disposed in one external series,

behind which is the deep groove which I have mentioned, and behind this again are numerous series of smaller but similar ones.

NEOTEPHRŒOPS ZEBRA.

The height is about three and one-third times in the total length, and the head nearly five times in the same; the orbit is four and one-half times in the length of the head; this is entirely covered with small scales, except on its upper surface, which is naked, and covered with pores. Body oval; scales numbering about 79 on the longitudinal line, and about 61 on the transverse one; those of the back and of the lower parts of the belly are very small, and very difficult to count; the scales are all ciliated on their outer edge, and have concentric lines on their surface. The dorsal is formed of 14 spines and 13 rays; the caudal is rather emarginated, and has 15 long rays, with 4 shorter ones, on each side; the anal has three rather slender spines—the first much shorter than the others, which are almost equal; the branched rays number 12, and the pectorals 17.

The general colour is of a dark grey; the back almost black, with eight or nine transverse, black, and broad stripes; the fins have a dark, yellowish tinge, and the pectorals are of a lighter colour; the sides of the head are purple; the eye white and silvery.

Some specimens have fifteen rays at the dorsal.

This fish appears to be the *Crenidens Zebra* of Richardson ("*Erebus* and *Terror*," p. 70), described from a drawing taken at King George's Sound. The difference in the number of rays (D. 11/15) being probably due to a mistake of the draughtsman. I have several specimens of this sort from 4 to 7 inches long, and one of nearly 13.

PAGRUS.

Genus formed by Cuvier on large and beautiful fishes, a few of which are found in the Mediterranean, but most of which inhabit the Cape of Good Hope and the Chinese Seas. In many of the sorts, the old males are remarkable by a sort of gibbosity which grows over the forehead.

PAGRUS UNICOLOR.

Chrysophrys unicolor, *Quoy et Gaimard, Voyage de l'Uranie*, p. 299.

Pagrus unicolor and guttulatus, *Cuv. & Val.*, vi., p. 162, 160.

(*The Snapper.*)

The *Snapper* is one of the largest and handsomest of the fish of the Melbourne Market. It is found all the year round, but the specimens caught in the cold months of the year are generally small; in November and December it becomes much more abundant, and the very large specimens are common. It is a good article of food.

As I had already observed at the Cape of Good Hope, with respect to *Chrysophrys*, the specimens of this sort are subject to very remarkable changes in their form. The female has always a rather oval profile, and the young male has the same; but in this sex, age brings on the developement of a curious crest on the nape of the head, and of a protuberance which, in very old individuals, takes the appearance of an enormous nose, and gives to some of these individuals a most remarkable resemblance to the human face.

The *Snapper* is of a beautiful silvery pink, with the lower parts of the body white and silvery; dorsal pink, with sometimes white spots on the membranes. The caudal becomes blackish towards its end; all the fins are pink, with the exception of the anal and ventral, which are white.

The young specimens are covered with white and sometimes with blue spots, which disappear with age; these appear to be the *Pagrus Guttulatus* of Cuvier. Some old specimens take a beautiful red colour. This sort attains large proportions, and sometimes weighs up to fifty pounds.

CHRYSOPHRYS.

This genus of Cuvier only differs from *Pagrus* by the upper molar teeth, which are here in at least three series, when in *Pagrus* they are only in two.

CHRYSOPHRYS AUSTRALIS.

Chrysophrys australis, *Gunther, Catal. Brit. Mus.*, v. i. p. 494.

(*The Bream.*)

This fish is one of the most common in the Melbourne Market throughout all seasons of the year. It is esteemed as food, but never attains to a large size, the longest specimens being about 12 inches.

The Australian *Bream* is a sea fish, but often enters the rivers, and is common in the lower Yarra and also in the Gipps Land lakes.

Its colour is silvery; grey on the upper parts. There is a slight brown transverse band on the forehead; dorsal fin hyaline, bordered with black; caudal rather yellow, with a dark external border; anal sometimes yellow, other times dark; ventrals yellow, sometimes in part blue; pectorals yellow.

Dr. Gunther has been mistaken when he says (page 494) that this sort has *shining golden longitudinal streaks*. Nothing similar is seen in the fresh specimens.

SQUAMIPINNES.

"Body compressed and elevated, covered with scales, which are sometimes exceedingly finely ciliated, and sometimes smooth. Lateral line continuous, not continued on the caudal fin. Mouth in front of the snout, generally small, with lateral cleft. Eye lateral, of moderate size. Six or seven branchiostegals. Dentition formed by villiform or setiform bands, without canines or incisors; some of the genera with teeth on the palate. Dorsal fin formed by a spinous and soft portion of nearly equal development; anal with three or four spines, similarly developed as the soft dorsal, and both many-rayed. The vertical fins more or less densely covered with small scales; the spinous portions sometimes

not scaly. The lower rays of the pectorals branched; ventrals thoracic, with one spine and five soft rays. Stomach cæcal; pyloric appendages, in moderate number; intestines generally with many convolutions. Air-bladder present, more or less simple. Pseudobranchiæ well developed.

"Mostly carnivorous fishes, inhabiting the seas between the tropics, especially of the Indian region; a few entering rivers or spreading beyond the tropics."

I have not found any sorts of this family in the Straits of Bass nor in Hobson's Bay, but several are found on the coast of New South Wales and on the northern shores of Australia.

CIRRHITIDÆ.

"Body compressed and oblong, covered with cycloid scales; lateral line continuous. Mouth in front of the snout, with lateral cleft. Eye lateral, of moderate size. Cheeks not cuirassed. Generally six, sometimes five, in one genus three branchiostegals. Dentition more or less complete, composed of small pointed teeth, sometimes with the addition of canines. One dorsal fin, formed by a spinous and soft portion of nearly equal development. Anal with three spines, generally less developed than the soft dorsal. The lower rays of the pectoral fins simple and stout; ventrals thoracic, but remote from the root of the pectorals, with one spine and five rays.

"Carnivorous fishes, inhabiting the seas of the tropical regions of the southern temperate parts of the Pacific."

CHIRONEMUS.

This genus was established by Cuvier and Valenciennes, on a sort found at King George's Sound (*Georgianus*). These fish are very nearly allied to *Aplodactylus*, and are, in fact, only discernible from the latter by the presence of small teeth on the vomer; and it is remarkable that, the same as them also, they seem to be confined to the Antarctic Seas of the globe. Dr. Gunther changes the name of Cuvier's genus into *Haplodactylus;* but, as I have said previously, I think those rectifications ought not to be adopted, and that, when a name has been badly formed, it is better to consider it as having no meaning than to uselessly increase the scientific nomenclature.

CHIRONEMUS MARMORATUS.

Chironemus marmoratus, *Gunther, Catal. of the Fishes of the British Museum*, v. ii., p, 76.

(Kelp Fish.)

D. 15—1/17. C. 15. A. 3/7. V. 1/5. P. 15.

Height of body four and one-third in total length; head four and two-thirds in same; eye five and one-third in length of head. Incisors strongly tricuspid, disposed on the upper jaw in four, and on the lower one in three series; each series decrease in size; six simple pectoral rays in some specimens, and seven in others. Head rather thick; the lateral line follows the line of the back, at about one-third of the height of the body. First dorsal rather long, and joins the second by spines and membranes much lower than the anterior ones; the first spine low, not more than one-third of the second; this considerably shorter than the third, which, with the fourth, are longer than all the others, and these decrease in length as they extend backwards. The spine of the second dorsal is much longer than the last of the first, and about half as high as the soft rays, which follow it; the caudal is emarginated, the end of each lobe being pointed; the anal is narrow, but long and pointed; the first spines are small; the ventrals are long and pointed; the pectorals very large.

The general colour of the upper parts is brown. On the sides of the head there is a rosy tinge, and on the back a green one. The lower parts of the body are of a greyish white. The entire

fish is variegated with irregular brown spots, forming numerous and irregular concentric lines. The eye is brown.

I found in the stomach a large quantity of seaweed. This fish appears rather scarce, and is only found during the hot months of the year (in September, November, and December,) on the Melbourne Market. The fishmongers say that it is not generally eaten; the flesh is dark, but was found good. The largest specimen I have seen of this handsome fish is 19 inches long. It is always found among the seaweed.

CHEILODACTYLUS.

This genus, which was formed by Lacepede, is almost entirely confined to the extreme southern parts of the globe, being from the south of Chili, the Cape of Good Hope, New Zealand, and Australia. Two sorts are rather common on the Melbourne Market, and are used as food of middling quality.

Dr. Gunther changes the name in *Chilodactylus*, but I, once more, do not consider these rectifications as desirable.

CHEILODACTYLUS MACROPTERUS.

Cichla macroptera, *Bloch.; Schneid.*, page 22.
Cheilodactylus macropterus, *Richard., Trans. Zool. Soc.*, v. iii., p. 99; *Proceed. Zool. Soc.*, 1850, p. 62.

I have sometimes heard this fish called *Bastard Trumpeter* by the fishmongers. It is remarkable by its sixth pectoral ray, which is extended more than twice and sometimes three times the length of the others.

The colour is silvery, with the upper parts and the head of a light purple; there is a black spot behind the upper part of the operculum; the branchiostegal membrane is of a beautiful light blue; the dorsal, caudal and anal are of a rather dirty yellow, with the spines purple; the ventrals are white, and the pectorals yellow, with their interior rays white; eye silvery, surrounded by a blue ring. The sides sometimes show some iridescent longitudinal streaks.

It is usually about a foot long, and very rarely attains 18 inches, and is found on all the southern coasts of Australia and New Zealand.

CHEILODACTYLUS NIGRICANS.

Cheilodactylus nigricans, *Richard.*, *Proceed. Zool. Soc.*, 1850, page 63.

——————————— *Ann. and Mag. Nat. Hist.*, 1861, v. vii., p. 270.

——————————— *Gunther*, *Catal.*, v. ii., p. 79.

(*The Butter Fish.*)

This is much more common than the other sorts on the Melbourne Market, and is found all the year round. The colour is of a blueish grey, covered with brown spots, which on the sides take the form of irregular longitudinal lines; lower parts of the body of a dirty white; the head has a copper tinge on its upper part, and a gilt one on its sides. There are generally two brown bands on the operculum. Eye yellow; dorsal of an obscure olive colour, spotted with brown; caudal and anal similar, with a narrow terminal white edge; pectorals of a dark brown; ventrals similar, with the part nearest to the body becoming white. In some specimens, the colour is darker, but the spots always exist. It is usually about a foot long, but sometimes it attains twenty-six inches; in these very old ones the spots on the fins often disappear, but those of the body are permanent.

It is by mistake that the authors describe this fish as of an uniform blackish grey.

CHEILODACTYLUS GIBBOSUS.

Cheilodactylus gibbosus, *Richard.*, *Transac. Zool. Soc.*, v. iii., p. 102; *Proceed. Zool. Soc.*, 1859, pl. 2, fig. 3.

D. 18—25. C. 15. A. 3—10. P. 13.

Height three and a-quarter times in total length; head four and a-half times in same: eye three and eight-tenth times in length of head. The upper profile is rather short, and very gibbous over the head; the mouth is extensible; the teeth rather long for this genus; the cheeks and the two opercles are covered with small scales. On the upper surface of the head there are on each side two large tubercles, the one situated over the anterior margin of the eye, and the other in front, just above the insertion of the lip. The lateral line follows the back, at about one-third the height of the fish at its insertion, and approximating

more to the upper profile as it extends backwards; the scales number about 69 on this line, and 26 on the transverse row, 10 of which are above the lateral line. The dorsal fin has its three first spines much shorter than the others (the third being about three times as long as the first); the fourth is the longest of all, and about twice as long as the third, or six times the length of the first; the others go on decreasing gradually. The soft part of the fin is shorter than the other, and only about two-thirds its length, but it is higher; the first rays being one-third longer than the last spine; the base of the membranes of the soft rays is scaly. The caudal is very strongly emarginated, and bi-lobed; the upper lobe is larger than the lower one; the membranes are in part covered with scales; there are three short external rays on each side of the large ones; anal with three rather slender spines, the second more than twice the length of the first, and the third longer still; the first soft rays are about twice as long as any of the spines; the others go on increasing; the ventrals are rather long; the spine is slender, and about two-thirds the length of the first soft rays. The pectorals are large, formed of eight branched rays and of five simple ones; the second and third of these extend in a long filament, about three-fourths the total length of the branched rays; the first and fourth are much shorter, the fifth is shorter even than the branched rays.

The general colour is of a light purple, with the lips pink; the eye is yellow, with an external orange circle; the body is crossed by two very broad transverse bands, formed by the scales being, in the place they cover, largely bordered with black; the first extends from the root of the fourth dorsal spine to the base of the anal; the second begins behind the first soft rays of the dorsal, and attains the first soft one of the anal; the dorsal fin is purple, tinged with green; the transverse bands of the back extend sometimes on the corresponding membranes; the caudal is sometimes of a brownish red, and sometimes of a dark brown, showing a faint transverse reddish band; anal black, with the spine purple, and a reddish tinge on the first rays; ventrals black; pectorals also, but these have a narrow white border.

This fish appears in the warm months of the year (December and January). It is found in the sea weeds, and its usual length is about 12 inches.

LATRIS.

This genus was established by Sir John Richardson, in the third volume of the "Transactions of the Zoological Society," and in his account of the fishes brought to England by the Expedition of the *Erebus* and *Terror* he gives the figure of a second species, already named *Ciliaris* by Forster in his manuscript notes, which have been since published by Lichtenstein. Richardson also thinks that another of Forster's sorts, on which Bloch (edit. Schneider, page 341,) has established his *Cicla Lineata*, ought to be placed here. This latter seems to be very nearly allied to the second sort I describe, under the name of *Latris Forsteri;* but it is said that the sailors gave it the name of *Yellow Tail*, which could never have been applied to my sort; it was found in great quantities on the coast of New Zealand.

The different species of this genus are edible, and even considered great delicacies.

LATRIS HECATEIA.

Latrie hecatei, *Richard., Proceed. of the Zool. Soc.*, 1839, p. 99.
——————————— *Transac.* v. iii., p. 106, pl. 6, fig. 1.

(Hobart Town Trumpeter.)

Grey, with the back rather darker; three or four broad longitudinal bands extend all along the sides of the head and body; belly of a dirty white; the dorsal fin is of a dark colour, as well as the caudal; the other fins are generally of a dark yellow.

This sort is frequently found on the southern coast of Tasmania, and it has also been met with in Bass's Straits, and is accidentally caught in Hobson's Bay. Its name is derived from the singular noise it produces. It is said that some specimens are nearly three feet long; it is the dearest and most esteemed fish of the Melbourne Market. Large quantities are also brought salted from Tasmania.

LATRIS FORSTERI.

(Bastard Trumpeter.)

The height of the body is not quite three times in the total length; the head is four and a-half times in the same; the orbit is contained four and a-half times in the length of the

head. The general form is almost a regular oval; the top of the head and the snout have no scales, but all the other parts of the head are covered with them; on the upper jaw, there is an external row of rather long, slender, conical and blunt teeth, and behind them several irregular rows of smaller, arched and more acute ones; at the lower jaw, there is only the external row, and the teeth are placed at some distance one from the other. The lateral line is regular, extends to the base of the caudal, and covers about one hundred and twenty scales; the dorsal fin is formed of sixteen spines, the longest of all being the fourth and the fifth; the three first going on increasing as they are placed backwards, the last rays of the fin as short as the first. The second part of the dorsal is formed of one spine and forty rays; this spine is much longer than the last of the spiny part, but much shorter than the first soft rays, which are even longer than the highest spines; these rays go on decreasing to the end; the anal has the same form as the soft dorsal; it is formed of two spines and thirty-eight rays; the caudal is very strongly bifurcated; it has seventeen long rays and four shorter ones on each side; the pectorals are about one-sixth of the total length of the body, and are formed of eighteen rays; the ventrals are rather small; they are placed considerably behind the pectorals, and are formed of one rather long but slender spine and of five branched rays, the first of which has one-third more than the spine.

The colours are beautiful. The head is yellow in front, and green behind the eyes, with the sides purple; the mouth and the throat are of a fine pink; the back is of a light purplish blue, with numerous narrow golden longitudinal bands, which extend to the root of the caudal, and of which two are broader than the others; the lower parts of the body are of a whitish pink. The first dorsal has its membranes rosy, but they become darker in their upper part; the second is of a fine red, with a black external margin; the anal is similar; the caudal is greyish in its first half, and black in its external portion; the ventrals are rather dark, and the pectorals of a dirty yellow; the eye of a fine orange yellow.

This fish is known under the name of *Bastard Trumpeter;* its flesh is said to be delicate. It is very rarely brought to the

Melbourne Market, but is said to be common on the Gipps Land coast. The specimen I am describing is about 17 inches long. I have also five small ones about 9 inches long, which are entirely similar, but have only thirty-three rays to the anal ; the dorsal is of a rather dull colour.

LATRIS BILINEATA.

This *Latris*, of which I have only seen one single specimen, is so very similar to the last that I hesitated to constitute it as a distinct species. The form is entirely the same ; the dorsal is formed of fifteen spines and forty-one rays ; the anal of two spines and thirty-five rays, but the fourth of these has a prolongated filament of about one-half its length.

The body is silvery, with the back blue ; this has two longitudinal and rather broad golden bands on the sides ; towards the middle of the height there is a longitudinal impression like a second lateral line ; the inside of the mouth and throat are black.

From Western Port. Length, 7 inches.

LATRIS INORNATA.

The profile is nearly oval ; the height is three and one-third times in the total length ; the head four and one-third in the same. The dorsal is higher in its spiny than in its soft part ; the first is formed of sixteen spines, the fifth, sixth, and seventh being the longest ; the others grow shorter till they reach the second part, which is formed of one spine and forty rays ; these become smaller as they are inserted backwards ; the caudal is strongly bifurcated, of fifteen long rays ; the pectorals have nineteen rays.

The general colour is of a blueish silvery white, with the back and upper part of the head of a very dark blue, almost black. This colour extends to the lateral line, where it stops suddenly, without any graduation or shade ; this line has a yellow tinge. The first dorsal has its membranes of a greenish brown, with also a yellow tinge ; it has a rather narrow external black margin ; the second dorsal is rather red, and shows the same black border. The caudal is black, with an irregular transverse yellow margin, situated on its external portion ; the anal is white, with its base

pink; a small black spot is seen on its anterior angle; the ventral is whitish, and the pectoral of a rather yellowish green, with the base dark; the eye silvery, with a blueish tinge. There is a black spot on the upper part of the operculum.

The only specimen I have seen was taken at Western Port, in the month of October; it measured six inches and a-half.

TRIGLIDÆ.

"Form of the body oblong, compressed, or subcylindrical; eyes generally lateral, the cleft of the mouth extending on the sides of the muzzle; sometimes of hideous aspect. Eyes directed upwards, and the cleft of the mouth subvertical. Dentition feeble; teeth in villiform bands; generally without canines. Some bones of the head armed; suborbital ring articulated with the præoperculum. Epidermoid productions very variable. Two separate dorsal fins, or two distinct portions of the dorsal fin. Anal fin similarly developed as the soft dorsal. Ventrals thoracic, often with less than five soft rays. Five to seven branchiostegals; pseudobranchiæ; air-bladder often absent.

"Carnivorous fishes, found in all seas, a few only entering fresh waters. Some inhabit exclusively the fresh waters of both the Arctic regions. All live at the bottom of the water, being bad swimmers; a few are able to raise themselves into the air."

CENTROPOGON.

The species, on which this genus was formed by Dr. Gunther, was first noticed by White, under the name of *Cottus Australis*, and placed afterwards by Cuvier and Valenciennes in their genus

Apistus; but these naturalists formed on it a particular section, characterised by its being entirely covered with scales, and without any free rays.

CENTROPOGON AUSTRALIS.

Cottus australis, *White, Voyage N. S. Wales*, p. 266, pl. 52.
Apistus australis, *Cuv. & Val.*, v. iv., p. 399.
Sebastes pandus? *Richard., Erebus and Terror*, p. 70, pl. 41, fig, 3-4.

(*The Gurnet.*)

This is one of the most common fishes on the Melbourne Market, particularly during the cold months of the year.

The height of the body is about four times in the total length; the transverse diameter is contained about five times in the same, and the head three times and one-quarter. The diameter of the orbit is contained three and one-third times in the length of the head; the mouth is extensible.

This fish is too well known to require a detailed description. The upper parts are generally brown, with the lower parts of the head and body scarlet; dorsal green, with red spots; caudal similar, with its posterior half black; anal variegated with red, brown, and greenish white; pectorals with their upper part obscure, and variegated with red, and the lower one white, but also spotted; ventrals white. These colours are subject to much variation, and sometimes the upper parts are purple, and the lower almost white.

This sort is found on the western and southern coasts of Australia. Towards the north-east (Queensland), it gives way to another species very nearly allied to it (*Centrop. Marmoratum*, Gunther, "Proceed. Zool. Journ.," 1862, p. 190,) but which has the third spine of the dorsal proportionally short.

The largest specimens are about 16 or 17 inches long.

PENTAROGE.

This is another genus formed on a section of Cuvier and Valenciennes's genus *Apistus*, characterised by the absence of scales. Below the eye there is a long, arched, moveable spine, which, when extended, cuts like a sword; the skin is remarkably loose on the body.

PENTAROGE MARMORATA.

Apistus marmoratus, *Cuv. & Val.*, v. iv., p. 416; *Cuv., R. An. Illustré*, pl. 24, fig, 3.

Height three and one-fourth times in total length; breadth of body three and one-quarter times of the same; head three and one-fifth in entire length. The dorsal has thirteen spines and ten soft rays, but the last of the spines might be counted with the soft part; the third spine is the longest; the anal has three spines and six rays; the caudal has twelve rays; the pectoral eleven.

The colour is of a light olive on the upper and lateral parts, and white on the lower; the body is covered with large marmorated purple blotches, between which are numerous punctiform marks of the same colour; the dorsal, caudal, and anal are of the colour of the back, with similar spots; there is a broad purple band on the external part of the caudal and pectorals; the ventrals are white.

This sort is scarce at Melbourne. I have only seen three specimens—one three inches long, and the largest about seven. The eyes of the two smallest were purple, with an external series of small spots; the largest had its eyes yellow.

The specimens described by Cuvier and Valenciennes had been brought from Timor by the learned naturalist Péron; but this sort is found on all the western and southern shores of Australia.

PLATYCEPHALUS.

This is certainly a tropical form, though a few of the sorts extend to the coasts of Japan. Numerous species are found in Australia, and are known under the name of *Flat Heads*. They are more common in the cold than in the warm season.

PLATYCEPHALUS RICHARDSONI.

Height of body nine times in total length; breadth six times; head (to end of operculum) three and a-half times; orbit five times in the length of the head on the middle line, or six times to the end of the operculum. Head very flat, very broad, rounded in front, the transverse line before the eyes being only one and a-half times in the length of head, taken in its

middle line; the lower jaw longer than the upper one; the upper surface is irregular, and presents longitudinal interrupted ridges; the præoperculum is armed towards its external angle with two very strong spines, the lower of these being something longer than the upper one; the orbit is round, and has a rather strong spine towards its anterior inner portion; the præorbital has a spine towards the angle of the mouth, and another one above this. The body is very inflated near the head, and goes tapering towards the tail; the lateral line covers about sixty scales, and is formed on each of them by a short ridge, which divides itself in two or three arborescent tubes; the total number of transverse lines of scales is about ninety. The first dorsal is formed of an isolated, short, but sharp spine, and of seven long slender spines, bearing membranes; the second is the longest and the seventh is laying on the back, and difficult to perceive. The second dorsal has fourteen rays, the first being the longest; the anal is similar; the caudal has twelve long rays and several shorter ones on each side; the pectorals have seventeen rays; the ventrals are about one-third longer than the pectorals, and have a rather long and slender spine, and five branched rays.

The general colour is of an olive brown, covered with numerous crimson spots; the sides are grey, but also spotted with crimson; the lower parts white; fins transparent, with the spines and rays of the dorsal spotted with brown; caudal, ventrals, and pectorals with transverse lines of orange, with crimson tinged spots; the posterior part of the caudal is black.

Rather scarce; 18 inches long.

PLATYCEPHALUS BASSENSIS.

Platycephalus bassensis, *Cuv. & Val.*, v. iv., p. 247.
———— tasmanicus, *Richard., Zool. Trans.*, v. iii., p. 23.
———————— *Erebus and Ter., Fishes*, p. 23, pl. xviii., v. 1-2.

(*The Common or Bass Flathead.*)

Height about eleven times in total length; head, to the centre of the posterior part, one and a-quarter times in total length, and from the extremity of the operculum one and a-half times in the same; the orbit of the eye is seven times in the greatest

length of the head; the præorbital has only one point; the orbit none; the præopercular spines are large, the lower much longer than the upper one. The lateral line is marked on seventy-three scales, and the number of transverse lines is about one hundred and eight. The first dorsal is formed of a very small, isolated spine, and of some long ones, bearing membranes; the last is laying on the back, and thus six only are plainly visible. The second dorsal is formed of fourteen rays, as is also the anal; the first rays of the second dorsal are nearly as long as the first; caudal truncated, of twelve long rays and four shorter ones on each side; pectorals of seventeen rays; ventrals not much longer than the pectorals, but extending much further backwards. The teeth are very numerous, villiform, and all similar on both jaws; those of the palatines larger, and distant one from the other; the vomer teeth villiform in front, with the posterior ones larger and directed backwards.

The body is of a light lilac colour on the upper parts, covered with very small, obscure, rounded spots, which are much larger on the sides; fins transparent, with the rays of the dorsal, ventrals, and pectorals spotted with brown; the caudal has several transverse series of dark purple round spots, and a large blackish spot covers almost one-half of its extreme inferior part.

Very common on the Melbourne Market, particularly in the cold months. Length generally from 12 to 17 inches, but it is sometimes much larger.

Dr. Richardson, having received specimens of this fish from Tasmania, thought they were different from Cuvier's sort, and in this he has been followed by Dr. Gunther, but I have seen thousands of specimens from all parts of South-eastern Australia, and there is not the least doubt that they all belong to one sort.

PLATYCEPHALUS LŒVIGATUS.

Platycephalus lœvigatus, *Cuv. & Val.*, v. iv., p. 243.

(The Rock Flathead.)

Height about eight times in total length; breadth about seven and a-half in same; head, to the end of operculum, four times in total length; orbit six and a-quarter times in head, to the extremity of the operculum. The body long, and almost cylindrical; head elongate, smooth; orbits without spines; the

præorbital with a very feeble and blunt one ; the upper spine of the præoperculum longer than the second. The lateral line runs over about eighty-two scales, and the number of the transverse lines is about one hundred and twenty. The dorsal is formed of one small, isolated spine and of eight long ones, united by a large membrane ; the second dorsal and anal have fourteen rays ; the caudal thirteen long ones and several shorter ones on each side ; the pectorals are nearly as long as the ventrals, and are formed of eighteen rays. The teeth are very numerous, and all villiform on both jaws ; those of the vomer and palatines larger.

The general colour of the upper parts is a dark olive brown ; the lower parts being white and silvery ; on the sides of the body are numerous, round, brown and yellow spots. The lower parts of the head are of a reddish orange. Fins translucid, of a rather olive colour, with the spines and rays marbled with brown and orange ; anal rather rosy, with a brown spot on each ray ; the pectorals and ventrals are yellow, with transverse lines of round crimson spots. The colours of this species seem subject to considerable variations ; the very large specimens are often covered with large, elongate, marmorated blotches.

This sort is very common on the Melbourne Market, particularly in the cold months of the year. Its usual size is about 18 inches, but it sometimes attains nearly twice that size.

PLATYCEPHALUS PROXIMUS.

This sort is so very nearly allied to *Lævigatus*, in form and general aspect, as to have made me hesitate a considerable time before I separated it specifically. It differs from it by its head being considerably broader on its anterior part, and being, in front of the eyes, equal to a line drawn from the centre of the upper jaw to the posterior edge of the orbit, when in *Lævigatus* such a line would only attain two-thirds of the orbit. The eye is much larger and more oval, being nearly round in *Lævigatus*. The teeth are more numerous and finer ; those of the vomer all equal, and similar to a fine brush. The first dorsal is formed of one small free spine, and of only seven longer ones.

The colour is also rather different, being of a light purplish blue, with the lips and the sides of the head rosy ; the lower parts of the body are white, with some irregularly formed

blackish spots on the sides; these have a general transverse form; the caudal is grey, and the other fins are white and diaphanous, with the upper half of the pectorals and the inner one of the dorsal almost black.

Scarce; seen only once on the Melbourne Market, in the month of October. Length, 16 inches.

PLATYCEPHALUS FUSCUS.

Platycephalus fuscus, *Cuv. & Val., Hist. des Poissons*, v. iv., p. 341.

——————— *Quoy et Gaimard, Voyage de l'Astrolabe*, pl. 10, fig. 1.

(*Grass Flathead.*)

Height of body nine and a-half times in its total length; breadth five and two-thirds in same; head three and two-thirds in length of body; orbit five times and a-half in head to the line of the centre, or seven and a-half to the extremity of the operculum. Head broad and flat behind, conical and rather narrow in front; a transverse line drawn in front of the eyes, being contained twice in the length of the centre of the head, and once and three-fourths in its breadth at the operculum. The upper surface is rather smooth, and the elevated longitudinal lines interrupted; the orbits are rather oval, and have a strong tooth at their anterior inner portion; the præorbital has two strong teeth; the two spines of the præoperculum almost equal, but the lower one a little longer; the teeth are villiform, with the interior ones larger, and arched backwards on each side in front; on the palatines and on the vomer a line of strong, pointed, and hooked teeth; at the lower jaw the villiform teeth are less numerous, but there is an internal line of rather large and conical ones, placed a little apart one from the other. Body broad, going tapering towards the tail; the lateral line is formed as usual in this genus, and is marked on about sixty-four scales; the number of the transverse series is about one hundred. The first dorsal is formed of one short, isolated spine, and of eight long ones, united by the membrane; the last of these is partly hidden in the skin, so that only seven are plainly visible. The second dorsal is formed of fourteen rays, as is also the anal;

the caudal of twelve long rays and of several small ones on each side; pectorals rather large, formed of seventeen rays; ventrals very large, being a good third longer than the pectorals, formed of five rays and of a rather short spine.

The general colour is of a dark brownish blue, with the sides yellow, and the lower parts of a dirty white; the upper part of the head is green, as are also the fins; they are all marked with purple rounded spots; the caudal is black in its posterior portion, and more particularly on the lower part of it. In some specimens, the back is beautifully marbled with brown blotches.

This sort is found on seaweed bottoms. I have very little doubt that it is the *Platycephalus Fuscus*, but Cuvier and Valenciennes count one ray less to the second dorsal and to the anal.

NEOPLATYCEPHALUS.

Form of *Platycephalus*, but distinguished by the dentition; teeth very numerous, villiform, with other large canine and very sharp ones, widely separated, and placed between them at the lower jaw; at the upper one, these large teeth form a line on the palatines, and extend in a rather numerous bunch in front; those of the latter part are curved.

NEOPLATYCEPHALUS GRANDIS.

Height of the body about nine and a-half times in its total length; its breadth a little less than six times; head three and two-third times in total length; orbit seven and a-half times in length of head; this is broad posteriorly, almost conical; in front of the eyes, its breadth is one-half of its length, taken at its middle; the snout is rather angular in front; the upper surface of the head is smooth, and presents faint longitudinal uninterrupted lines; the præoperculum is armed towards its external angle with two strong spines, the lower being much longer than the upper one; in some specimens it is over twice its length. The orbit of the eye is oval, and has a nearly imperceptible point in front, at its upper part; the præorbital has two angles over the sides of the mouth; the lower jaw is considerably longer than the upper one. The body is inflated near the head, and goes tapering towards the tail; the lateral line runs over about sixty-two scales to the root of the caudal, on which it

extends; it is formed on each scale of a short edge, which expands in several arborescent tubes; these are not visible on all the scales, and the number of transverse lines is about ninety-five. The dorsal is formed of one isolated and rather short spine, and of eight long, slender ones, supporting the membrane; the last is adherent to the skin, and seven only are plainly visible, the longest being the second. The second dorsal is formed of fourteen rays, as is also the anal; the caudal has eleven long ones, and several shorter on each side; the pectorals seventeen; the ventrals are twice as long as the pectorals, and have one slender spine and five rays.

The general colour is of a pink lilac, covered with numerous irregular orange spots; the sides yellow; the fins are transparent and rather grey; their spines and rays are marbled with orange; the caudal has four transverse lines of rather large, rounded, orange spots, and its end is black.

This sort is not common on the Melbourne Market. It attains large dimensions, my specimens measuring from 20 to 23 inches in length.

TRIGLA.

I have only observed one species of this genus on the Victorian coast; but it is said that *Kumu* of New Zealand is also found here, but I have not seen it.

TRIGLA POLYOMMATA.

Trigla polyommata, *Richard.*, *Proceed. Zool. Soc.*, 1839, page 96.

———————— *Richard.*, *Trans.*, v. iii., page 87, pl. 5, fig. 2.

(*The Flying Gurnet.*)

This beautiful fish is of a most magnificent crimson pink, with orange tints; the lower parts are of a starry white with blue spots. The fins are of the colour of the back, with the rays more brilliant and of orange colour; the pectorals very large, and extending to the sixth ray of the anal, of a fine green with a purple external edge, and four or five transverse bands of dark blue. A large oblong double black spot, bordered with white, extends on the first half, near the external edge; the rays are purple; the anal is white: the eye silver colour.

One specimen had its pectorals of a light blue colour, spotted with yellow.

Without being common in the Melbourne Market, this fish appears in all seasons; but often for months there are none to to be seen, and then several will be caught together, and always attract attention by their beautiful appearance.

It is said to be very good for eating.

Richardson's figure conveys a very poor idea of the extraordinary beauty of this fish, and Dr. Gunther's description a still worse one of its colors.

LEPIDOTRIGLA.

Separated by Dr. Gunther from *Trigla*, on account of the large size of its scales.

LEPIDOTRIGLA VANESSA.

Trigla vanessa, *Richard.*, *Proceed. Zool. Soc.*, 1839, page 96.
———————— *Richard.*, *Trans. Zool. Soc.*, v. iii., page 83. plate 5.

(*Small Gurnet.*)

D. 11. A. 17. C. 11 (long rays). P. 10, and 3 free ones.

Height of body five and one-fifth in total length; head three and one fifth in same; the lateral line formed of sixty-nine spiny scales; caudal forcated, of a reddish pink colour, with belly white; the first dorsal has a broad black spot rounded with white; the pectorals are of a dark green, with a large bilobed black spot, edged with blue and white, placed at the end of its internal side.

The body is sometimes covered with small marmorated dark spots, but these are often missing. Eye yellow.

Seen several specimens in the months of July and August.

LEPIDOTRIGLA SPHYNX.

Trigla sphynx, *Cuv. & Val.*, v. iv., page 83.

1st D. 9.—2nd D. 14. A. 14.

Of a fine castaneous grey, with the sides of each scale rather dark; a series of rather large rounded black spots on the back and on the lateral line; the belly is white; the first dorsal is

pink, with a rather large rounded black spot on the external edge; it has a white ring round it; the second dorsal is white, with its edge rather yellow; its spines are marbled with yellow and brown; the caudal is rounded, of a grey colour, with five or six transverse lines of red spots; the anal has its first half white, and its external one of a bright yellow; the ventrals also yellow, with the rays orange; the pectorals are grey, with the rays pink and spotted with brown, their lower surface is black; the free rays are also spotted; eye yellow, spotted with brown, with an inner circle of a fine orange colour.

This sort seems to be very scarce, as I have only seen one specimen. It was in the month of July.

This fish was found many years ago, by the celebrated naturalist Péron, and was described by Cuvier and Valenciennes in their great work, but its locality was not known.

TRACHINIDÆ.

"Body elongate, low, naked, or covered with scales. Teeth in villiform bands, with pointed and conical canines in some of the genera; no molars or trenchant teeth. The infraorbital ring does not articulate with the præoperculum. One or two dorsal fins, the spinous portion being always much less developed and shorter than the soft; the anal similarly developed as the soft dorsal; ventrals with one spine and five rays. Gill-opening more or less wide; five, six, or seven branchiostegals; pseudobranchiæ. No prominent papilla near the anus. Air-bladder generally absent; pyloric appendages moderate in number or wanting.

"Carnivorous fishes, living at the bottom of the shores of nearly all the seas."

KATHETOSTOMA.

This genus was formed by Dr. Gunther on a sort of *Uranoscopus* of Bloch, remarkable by the total absence of scales.

KATHETOSTOMA LÆVE.

Uranoscopus lævis, *Bloch., Schneid. system*, page 47, pl. 8.
——————————— *Cuv. & Val.*, v. iii., page 319.
——————————— *Gunther, Catalogue*, v. ii., page 231.

(*Stone Lifter.*)

Breadth of head two and a-half times in the length, to the base of the caudal; length of head, from the extremity of the upper jaw to the centre of the posterior part, four times in the same; the long spines of the shoulder straight or directed rather externally.

The general colour is of an uniform brown on the upper parts and white below. On the sides of the head, and on the line of separation between the brown and the white there is a reddish pink tinge; the fins are brown, with the end of the caudal and the edge of the pectorals pink; the anal is of this last colour. The eyes are red, spotted on their limb with black in very old specimens, and yellow in others; the lips are red.

It is rather common on the Melbourne Market, but is not generally eaten. I have a large specimen, which is nearly 18 inches in length, but this sort does not usually measure more than half that size.

I have seen several times small specimens not more than six to seven inches long, which may, perhaps, belong to a different species; they are not quite so broad, the breadth of their head being three times in the total length to the base of the caudal, and the long spines of the shoulder being longer in proportion, and directed rather inwards. The general colour of this variety is a greyish yellow, with two broad black transverse bands on the body; caudal black, bordered with pink, as are also the pectorals and the dorsal. Eye yellow.

Cuvier's specimen, which had been brought from Australia by Péron, belongs to this latter variety; Bloch's, which he describes from a drawing communicated to him by Latham, was, on the contrary, entirely brown.

The fins have D. 16. C. 10. A. 13. P. 17. V. 1/5.

PSEUDAPHRITIS.

The new specie I propose here is formed on a fish manifestly belonging to the *Trachinidæ* of Gunther, and to his group of *Trachinina*, but forming, on account of its eyes, placed obliquely at the upper part of the head, a passage to his *Uranoscopina*. The cleft of the mouth is rather oblique; there are two dorsals; ventrals jugular, with nine spines and five soft rays; no canines. Almost all this would agree with *Aphritis*, but the scales are rather large; the first dorsal has seven rays, and just in front of the anal there is a short fin composed of two spines.

PSEUDAPHRITIS BASSÜ.

General form of the body oblong, rather cylindrical, and elongate; cleft of the mouth rather oblique, with the lower jaw longer than the upper one; eye placed obliquely on the superior part of the sides of the head. Height of the body seven and one-third times in the total length; head conical, four times in the same; eye six and three-quarters in the length of head.

The lateral line runs straight all along the body, over fifty-nine scales; the transverse line is formed of twenty scales, rather large and ciliated, of which six are over the lateral line. A longitudinal sulcate extends on the centre of the back from the posterior part of the head to the base of the dorsal; the head is entirely covered with scales; the præoperculum is entire; the operculum is terminated by a broad flat point.

The first dorsal with one spine and seven rays; it is rather high; second dorsal inserted near the first; it is formed of twenty rays; the caudal is rather large, subtruncated, with the angles rather prolonged, and formed of twelve long rays; anal similar to the second dorsal, formed of twenty-two rays, and in front are two small spines, rather curved, each supporting a small membrane, and adjoining the soft rays; the first spine being longer than the other; ventrals placed in front of the pectorals, and formed of one spine and five rays; pectorals rather large, and formed of eighteen rays; teeth very numerous on each jaw, cardiform, sharp; others similar on the vomer and palatines.

The upper parts are brown, with a few very faint transverse broad green bands on the back; sides of the head purple; the colour is red in front of the eyes; lower parts white;

dorsal fins of the same colour and hyaline, with the rays marbled with yellow and brown; caudal yellow, with four or five transverse crimson bands; anal pink; ventrals yellowish; pectorals yellow, with several narrow crimson lines of spots; eye yellow.

Seen only once; taken in the Straits of Bass, and dedicated to the celebrated discoverer of that region.

SILLAGO.

Genus formed by Cuvier in the "Règne Animal," on a fish that Bloch had placed with *Scicena* and Russel with *Sparus*. Forskal had made an *Atherina* of a sort he had found in the Red Sea. Cuvier placed this genus with his *Percidæ*, on account of the denticulations of its præopercule, and of the point that terminates its opercle, as also on account of the presence of teeth on the vomer; but Dr. Gunther has included it in the rather hetrogeneous family he calls *Trachinidæ*. It has certainly very little natural affinities with the group in which Cuvier had included it.

Most of the sorts inhabit the Indian Sea; others are said by Cuvier and Valenciennes to be found in Australia; but I have only observed two of them. *Bassensis*, which was found at Western Port by d'Urville's Expedition, has not yet come under my notice, and *Ciliata* was originally found at Cape York, but Dr. Gunther also records it from Tasmania and Sydney.

I cannot agree with this last anthor in considering *Bassensis* as a synonyme of *Maculata;* and as I have seen many thousand specimens of *Sillago* from Western Port, which all belonged to *Punctata*, I should be inclined to think it may be a variety of that sort, perhaps rather similar to the white one I describe below.

SILLAGO PUNCTATA.

Sillago punctata, *Cuv. & Val.*, v. iii., p. 413.

(*The Whiting.*)

Form very elongate; height of body eight times in total length; head five times in the same; orbit four and a-half times in the length of head. The dorsal has twelve spines at its first fin, and one with twenty-six rays at its second; the anal has one spine and twenty-two rays; the caudal is strongly bifurcated,

and has seventeen long rays and four shorter ones on each side; the pectorals have fourteen rays.

The upper parts are of a brownish grey; the sides and lower parts are white; these latter are covered with numerous very small, irregularly placed, but rounded spots of an obscure brownish colour; fins rather olive colour; the caudal yellow; the anal and ventrals white; eyes silvery.

Very common on the Melbourne Market almost all the year round; it is esteemed for the table. Average length, from 8 to 14 inches.

I have one specimen 9 inches long, of a white silvery colour, the back having only a greyish tinge; the spots very minute, and in reduced number; they were very little visible on the fresh specimen; the muzzle is a little shorter, and more regularly convex; the eye is a little larger than in the typical specimens.

SILLAGO MACULATA.

Sillago maculata, *Quoy et Gaimard, Exped. Freycinet Zool.*, pl. 53, fig. 2.

———-——— *Cuv. & Val., Poissons*, v. iii., p. 411.

The body is oval, much shorter than in *Punctata*. The first dorsal has eleven spines, and the second one spine and eighteen rays; the caudal has seventeen long rays; the anal two spines and nineteen rays; the pectorals have sixteen.

The height is five times and a-half in the total length, and the head less than three times in the same.

The upper parts are of a light olive colour, marbled with rather large brown spots; the lower parts are white; on each side of the body is a rather broad longitudinal band; the fins are diaphanous, with the rays spotted with orange; the exterior portions of the dorsal and the caudal rather obscure; the eye is silvery. Length, 6 inches.

Only seen once in September.

POLYNEMIDÆ.

"Body compressed and oblong, covered with scales, feebly ciliated or without serrature. Lateral line continuous, continued on the tail. Mouth at

the lower side of the snout, with lateral cleft. Eye lateral, large. Seven branchiostegals; pseudobranchiæ. Villiform teeth on the jaws and on the palate. Two separate dorsals, the second, the caudal, and the anal fin more or less covered with minute scales. Several filliform appendages below the pectoral fin, entirely free, and articulated. Ventrals thoracic, with one spine and five rays. The bones of the head with the muciferous system well developed. Air-bladder varying in form and structure, and sometimes wanting.

"Tropical regions of the Atlantic; East Indian seas to the Pacific. Entering rivers."

This family is represented by two sorts on the eastern coast of Australia, but none have yet been observed in the Victorian waters.

SPHYRÆNIDÆ.

"Body elongate, subcylindrical, covered with small cycloid scales; lateral line continuous. Cleft of the mouth wide, armed with strong teeth. Eye lateral, of moderate size. Seven branchiostegals; pseudobranchiæ and air-bladder present. Two dorsal fins, remote from each other; anal similar to the second dorsal; ventrals abdominal, composed of one spine and five rays.

"Carnivorous fishes, inhabiting the seas of the temperate and tropical regions."

SPHYRÆNA.

Though one sort of these fishes is found in the Mediterranean they may be considered as belonging more to the warm than to the temperate climates, the great majority of their sorts inhabiting below the tropics.

SPHYRÆNA NOVÆ-HOLLANDIÆ.

Sphyræna novæ-Hollandiæ, *Gunther*, *Catal.*, v. ii., p, 335.

(*The Pyke.*)

This sort is well described by Dr. Gunther, with the exception of the teeth, which are not those of the adult specimens, but of the young ones.

Teeth of the upper jaw small, equal, numbering thirty-eight or forty on each side; two pair of fangs, of which the posterior are much the largest and strongest; the palatines have three small teeth at their posterior part, and seven strong ones more forward; these are very acute and conical, the third of them being often a little longer than the others. At the lower jaw there are, in front, a strong fang on each side, and a dozen straight, acute, canine teeth placed on each side; they are distant one from the other, small in front, and becoming larger as they extend backwards.

The colour is of a slatey grey on the upper parts, with the sides and belly white; the back and upper part of the head are sometimes almost black; the sides of the head and sometimes the lateral line have a copper tinge; the fins are of an olive green, changing to yellow in some parts; eye silvery.

The fishmongers say that, some years ago, this fish used to be generally larger than now, and that it was quite common to get them over a yard long. It is only rarely that such specimens appear on the market. The *Pyke* is one of the best and most wholesome of the Melbourne fishes. I only find 126 to 129 scales on the lateral line.

NEOSPHYRÆNA.

This genus has entirely the general appearance of *Sphyræna*, but the ventrals are situated almost under the pectorals; the

second dorsal and the anal have a very large number of rays (over twenty); the head is entirely scaly; the first dorsal is comparatively smaller, and the dentition is different.

The lower jaw is obtuse, and considerably longer than the other; on the upper one the teeth are small, almost equal, but the centre ones rather larger than the others, and are numerous. Behind this is a band of very numerous, villiform, and very small teeth; this band is narrow in front and behind, but broad towards the centre of the jaw. In front, there are on each side two very large fangs, the posterior one much longer than the other; on each palatine there is a single line of very small teeth, and some larger ones on the vomer. At the lower jaw, there is a line of very minute teeth, which does not extend in front, but is replaced in this part by rather large, acute ones, directed backwards; towards the middle, and inserted behind the line I have mentioned, there are on each side two large fangs, apart one from the other. In some specimens there are three. The head is entirely scaly, and its upper part has no longitudinal sulcates; the præoperculum is rounded, and finely ciliated on its margin; the operculum terminates with a rather prolongated, obtuse, flat point. Scales rather large; they fall easily; the lateral line is well marked, continuous; the ventrals are united at their base; they are formed of one spine and five rays.

NEOSPHYRÆNA MULTIRADIATA.

Body thick and rather short; contained about six and a-half times in the total length; the head three and two-third times in same; the orbit four and two-third times in the length of the head. The snout is rather short; the distance between the extremity of the upper jaw to the anterior orbit being equal to the distance between the posterior edge of the same orbit and the extremity of the operculum; head entirely scaly; the lower jaw longer than the upper one by one-half the diameter of the eye; the lateral line running over about seventy-five scales, which fall very easily; the first dorsal is formed of five rays; the second dorsal of from seventeen to twenty-one rays; its anterior part much higher than its posterior one; the caudal is emarginated, with sixteen rays; the anal is longer than the dorsal, with twenty-eight rays; the ventrals, placed almost below the pectorals, are

formed of one very slender spine and five rays ; the pectorals of sixteen rays ; the second dorsal is higher than the first, its fourth, fifth, and sixth rays being the longest, and equal to the length of the snout ; the others become shorter as they go backwards ; the anal is of the same form. The first dorsal is situated on a line that would cut the end of the pectorals ; the second is inserted at a distance from the first, equal to the space between the beginning of the first and the end of the operculum. The pectorals are a little longer than the ventrals.

The upper parts are of a slatey grey ; the lower white ; the eye is silvery ; the second dorsal and caudal are of an obscure yellow ; pectorals white, as are also the ventrals and anal ; sometimes a rather large, irregularly-rounded black spot on the upper lobe of the caudal, near its extremity

Common in the months of May, June, and July ; it attains 2 feet in length. The fishermen sometimes call it *Skip Jack*, but that name is more particularly applied to *Temnodon Saltatar*. It is considered equal to *Sphyræna Novæ Hollandiæ* for the use of the table.

MEASUREMENTS.	*Inches.*
Total length	$15\frac{3}{8}$
From exty. of upper jaw to ant. edge of eye	$1\frac{5}{8}$-$\frac{1}{2}$
——— lower ———	2
Diameter of eye	$\frac{3}{4}$
Height from post. edge of eye to end of oper.	$1\frac{7}{8}$
——— to base of pectorals	$1\frac{5}{8}$-$\frac{1}{2}$
——— of ventrals	$2\frac{1}{2}$
Height of head at centre of eye	$1\frac{5}{8}$
——— of body	$2\frac{3}{4}$
From extm. of upper jaw to root of 1st dorsal	5
——— of 2nd dorsal	$7\frac{3}{4}$
Length of 1st dorsal	$\frac{3}{4}$-$\frac{1}{2}$
——— of 2nd dorsal	$2\frac{1}{8}$
Height of 1st dorsal	$\frac{5}{8}$-$\frac{1}{2}$
——— of 2nd ——— at its base	$1\frac{3}{4}$
——— at its extremity	$\frac{1}{2}$-$\frac{1}{2}$
Length of caudal in centre	1
——— on the sides	$2\frac{1}{4}$
——— of pectorals	$1\frac{7}{8}$

	Inches.
Length of ventrals	$1\frac{3}{8}$
Distance of ventrals behind pectorals	$\frac{5}{8}$-$\frac{1}{4}$
From extremity of lower jaw to ventrals	$4\frac{3}{4}$
———————————— to anus	$7\frac{1}{8}$
———————————— to anal.....	$7\frac{5}{8}$
From anus to base of anal	$\frac{1}{2}$
-———— to extremity of anal	4-1

Nota.—It would be more exact to say that the two first rays of the second dorsal are not branched, and could be called spines if they were not soft; the following (third) ray is much longer.

SCIÆNIDÆ.

"Body compressed and rather elongate, covered with ctenoid scales. Lateral line continuous, and often continued on the tail. Mouth in front of the snout Eye lateral, of moderate size. Seven branchiostegals. Teeth in villiform bands, with canines in some of the genera; no molars or trenchant teeth in the jaws; no teeth on the palate. Cheek not cuirassed; the opercles not, or feebly, armed. Two dorsal fins, the soft one much more developed than the spinous or the anal; the spines of the first dorsal generally feeble and elevated. The anal fin with two spines. All the rays of the pectorals branched; ventrals thoracic, with one spine and five soft rays. The bones of the head with one spine and five soft rays; the bones of the head with the muciferous system very developed. Stomach cæcal; pyloric appendages in small or moderate number. Air-bladder with branching

or very elongate appendages, sometimes absent. Pseudobranchiæ sometimes hidden."

It appears to me that this family is placed by Dr. Gunther too far from *Percidæ*, to which it is very nearly allied.

In speaking of this family Dr. Gunther says, "*not to be found in Australia*; but in this, as it so often happens, nature does not submit herself to the laws imposed by naturalists. The presence of a large *Scicena* in the Victorian seas was first announced by Professor M'Coy, in his "Notes on the Zoology of Victoria," in the Reports of the International Exhibition of Melbourne, 1866. He considers it as the same as the Mediterranean sort, *Sc. Aquila*. This might have been the case, as the species that abounds at the Cape of Good Hope, and on which Cuvier had formed his *Scicena Hololepidota*, does not appear to differ specially from it, but on comparing a specimen of the Australian fish with the descriptions of Cuvier and Dr. Gunther, I find differences which will not allow me to adopt the opinion of the learned Professor of the Melbourne University. In fact it appears doubtful that it even belongs to the same genus. Dr. Gunther gives *Scicena* as a character to have the upper jaw overlapping the other one, both jaws being equal; and in the Australian fish the lower jaw protrudes over the upper one. Cuvier attributes also to *Scicena* the character of having the præoperculum serrated; but in old individuals this disappears. Taking even for granted that the Australian fish belongs to *Scicena*, we still find numerous differences with the European sort.

SCIÆNA.

SCIÆNA ANTARCTICA.

(*The King Fish.*)

Taking Cuvier's description, we find: 1st, that in the European sort the cleft of the mouth extends to below one-third of the eye: in *Antarctica* it ends before the eye. 2nd, that at the lower jaw there are numerous small teeth between the large ones: none exist in the Australian fish. 3rd, the diameter of the eye forms about one-sixth of the total length of the head: in *Antarctica* the orbit is only one-eighth, and the eye

of the fresh specimen is contained nine and a quarter times in the same. 4th, that the diameter of the eye is only twice in the muzzle: in the Australian sort it is sensibly more. 5th, that the eye is near the superior profile of the head, and distant from the lower one by twice its diameter: in the new sort this last proportion is contained three times. 6th, that the European sort is, when fresh, of a silvery grey, rather brown on the back, and whitish below; that the first dorsal, the pectorals, and the ventral, were of a rather fine red, and the other fins of a reddish brown: in the Australian fish the upper parts were of a fine blue, changing to green; the sides and lower parts of a dirty white, rather silvery; the dorsal, anal, and ventrals reddish; the pectorals white, with their extremity dark; the præoperculum has no denticulations, but towards its angle there are some sinuosities or notches; this may depend on age.

The teeth on the upper jaw are of two sorts—1st, an external line of large conic ones; they are rather curved backwards, and placed at a considerable distance one from the other in rather an irregular way; they number about twelve on each side; those in front are the largest, and they become very small as they extend backwards. Behind these is a band of villiform teeth, formed of four or five very irregular series; these teeth are small, obtuse, and directed backwards; they are not so numerous in front as towards the posterior part of the mouth, but a few larger ones are seen in this part. At the lower jaw there is only the external line of large irregular teeth, fourteen or fifteen in number; at the anterior part there are two extra ones placed in front of the others; the inside of the mouth and the tongue are smooth.

The orbit is oblong, being one-fourth longer than its breadth.

The scales which cover the head are much smaller than those of the body; these are densely punctured, and have concentric lines; they are externally edged with a sort of a little Sciæna fringe. The lateral line runs over about sixty-eight scales, but their oblique disposition renders it difficult to count them with certainty. The head is four times in the total length; the eye yellow, with a narrow golden circle.

I have only seen one fresh specimen of this sort; it measured fifty-seven inches long, and twelve and one-fifth in height. The head alone weighed eighteen pounds; the first dorsal had nine spines, and the second dorsal one, and twenty-seven rays; the anal two spines and seven rays; the caudal seventeen long rays, and three shorter ones on each side; the pectorals seventeen rays.

This fish is very scarce, and sometimes two or three years elapse without one single specimen being caught; it is considered a great delicacy, and in consequence sells at a high price; the specimen I mention brought two pounds ten shillings. The remarkable edible qualities of this fish seem to be equal to those of the Mediterranean sort, which was considered by the Romans of the Middle Ages to be the most delicious of all food; and of which the learned Cuvier relates many curious anecdotes.

At the Cape of Good Hope, where *Aquila* is so common (at least Dr. Gunther considers that it belongs to the same sort), the young specimens only are eaten fresh, and the large ones, being hard and dry, are salted like cod, and exported to the Mauritius.

The Australian fish seems an accidental visitor in the Straits of Bass, as it appears exclusively in the cold months, and only very large specimens have ever been seen.

At the Cape of good Hope the young specimens are common in the warm months, and the large ones in the Antarctic winter.

TRICHIURIDÆ.

"Body elongate and compressed; naked or with minute scales; eye lateral; cleft of the mouth wide, with several strong teeth on the jaws, or on the palate; the spinous and the soft portions of the dorsal and the anal elongate and many rayed; tail sometimes with finlets; ventrals thoracic, some rudimentary, or entirely absent; no prominent papilla near the vent, gill-opening wide; seven or eight branchiostegals; pseudobranchiæ; an air-

bladder; pyloric appendages in increased number; the abdominal and caudal portions of the vertebral column composed of numerous vertebræ.

"Inhabitants of the seas between the tropics, extending on to those of the temperate regions."

THYRSITES.

Formed by Cuvier and Valenciennes on a curious elongate fish. The sorts of this genus are not numerous; one is found in the Mediterranean Sea, and extends to Madeira, where a second sort is also met; another, *Lepidopoides*, inhabits the coast of Brazils; one the East Indies; and two are described as found in the Australian Seas. One of these is unknown to me (*Solandri*), the other is very common in the Straits of Bass, particularly during the cold months of the year; this sort is also found in great quantity at the Cape of Good Hope, where it bears the name of *Snoek*. In that Colony it appears in the beginning of August, becomes very abundant in September, and disappears a few months after; it is considered the best fish of the country.

THYRSITES ATUN.

Scomber atun, *Euphrasen, Vetensk. Acad.*, v. xii.
Thyrsites atun, *Cuv. & Val., Poissons*, v. viii., p. 196, pl. 219.
———— altivelis, *Richard., Proceed. Zool. Soc.*, 1839, p. 99.

(*The Barracuta.*)

The Australian fish appears to me to be entirely similar to the Cape specimens, and I don't doubt that this sort inhabits all the Antarctic Seas. It is of a dark silvery colour, with the upper parts of an obscure blue; eye yellow: the dorsal variegated with black and white.

Very common at certain seasons, and much esteemed as food.

The *Thirsites Altivelis* seems to have been established erroneously; in all the Australian specimens, I find the longest ray of the dorsal much lower than the body, and also only six *pinnulæ*. In some cases, particularly in old specimens, the last ray (or rays) of the second dorsal detaches itself from the others, and takes the appearance of a seventh

SCOMBRIDÆ.

"Body generally elongate, compressed, naked, or covered with scales of small or moderate (nomeina) size; eye lateral. Dentition variable. The infra-orbital bones do not articulate with the præoperculum. The spinous dorsal less developed than the soft or than the anal, either continous with or separate from, the soft portion, sometimes rudimentary or entirely absent. The soft dorsal and the anal sometimes divided posteriorly into finlets. Ventrals thoracic, sometimes rudimentary or entirely absent. No prominent papilla near the vent. Gill-opening wide; generally seven branchiostegals. Pseudobranchiæ, and an air-bladder; pyloric appendages generally in great number.

"Inhabitants of the high seas of nearly all the regions, many of the species having a very wide range."

THYNNUS.

Genus formed of a small number of large species, found in the temperate and warm seas. One alone appears in the Melbourne Market, and it has not been yet described, as far as I can ascertain.

THYNNUS MACCOYÜ.

(*The Bonite.*)

The height is four times in the total length; head three and one-third in same; the thickness of the body is contained one and two-third times in the length; the body is short and thick. The lower jaw is rather longer than the other; the orbit is not quite five times in the length of the head. The body is covered with very small scales, but along the back there is a line

of larger ones, that extends downwards over the pectorals at about one-fifth the length of the body, and then stretches itself backwards to the full length of the above mentioned. This lateral line, from the posterior part of the space occupied by these large scales to the base of a ridge, which exists on each side at the posterior part of the body is margined by a succession of round scales, numbering about one hundred and eighty, and having each a longitudinal ridge or keel; the præoperculum is covered with irregular transverse lines, that are barely visible on the fresh specimens; the teeth are conical, rather curved backwards, sharp, and number from twenty-five to thirty on each side of both jaws. The first dorsal has thirteen or fourteen spines; it is high in front, and strongly emarginated, all the spines becoming smaller as they are inserted backwards; the second dorsal, which is separated by a short distance from the first, is composed of one spine and thirteen rays; the upper and lower *pinnulæ* number nine; the caudal is formed of eighteen long rays, and of a large number of shorter ones on each side; some of these are nearly as long as the full sized ones; the anal has the same form as the second dorsal, and has thirteen rays; the pectorals equal in length two-thirds of the head; they are received in a sort of a groove; they have thirty-two rays.

This fish is entirely of a blueish black, with brown tinges on the sides of the head. The first dorsal is of a general obscure colour, with the spines reddish; the other fins are brown, with a part blue; the *pinnulæ* of the last colour; eye silvery.

The flesh of this fish is not eaten, or at least is not esteemed as food. It is very scarce at Melbourne; those I saw appeared towards the end of November.

On the dried specimens there are two small ridges on the posterior part of the larger one we have mentioned, but they do not appear on the fresh ones.

My largest specimen is about twenty-three inches long.

SCOMBER.

The type of this genus is the common *Mackerel;* it used to contain a very considerable number of fishes, but it is to-day restricted to a very small number of species, all very nearly allied to the sort just mentioned. One species has been described by

Cuvier and Valenciennes as inhabiting King George's Sound, and a fish very nearly allied to it appears, but very rarely, on the Melbourne Market.

SCOMBER ANTARCTICUS.

(*The Mackerel.*)

Height of body five and a-quarter times in its total length; head four and a-quarter times in the same; orbit five and a-half times in the length of head. The first dorsal has eleven spines, the longest of which is the second, the last being very small and difficult to see; the second dorsal has one spine and eleven rays, of which the first is the longest, and the others go on decreasing, the four last being about equal amongst themselves and also to the spine; these cover five *pinnulæ*. The caudal has fifteen long rays and numerous shorter ones on each side; the lower *pinnulæ* are also five in number. The anal has the same form as the dorsal, and shows one spine and eleven rays; the pectoral has twenty rays. The membrane that covers, on each side, a part of the eye does not hide more than one-third of it. On the living specimen, the lower portion of the præoperculum appears entirely striated; but on the dried one it is smooth, and the interior edge seems to bear the marks of strong denticulations; the upper part of the præoperculum is covered with scales, and others, much larger and of a very elongate form, cover a space below the eye. The teeth are small, rather hooked, equal, and disposed on a line; at the upper jaw, they are only visible in front, and, after decreasing in size, disappear entirely on the sides; on the lower jaw, they are much more numerous and extend backwards; on each of the palatines there is also a line of numerous teeth, rather longer, more slender, and more arched than those of the jaws. There is no air-bladder.

The colour is of a dark greenish blue on the upper parts, and of a silvery white on the lower ones; the back is covered with black waving lines, very irregular, but having generally a transverse disposition. On the sides of the body is a longitudinal series of larger and rounded ones; all the lower parts are covered with little black dots, very numerous, and irregularly disposed. There are yellow tinges behind the eye and on the sides of the body, and the lower part of the sides of the head shows five

indistinct colours. The first dorsal is greenish, with its external part rather darker; the second is yellow, as is also the last; the upper *pinnulæ* are black, and the lower white; the anal and ventrals are of the latter colour; the pectorals are almost black; the eye is silvery.

I have only seen one specimen of this fish on the Melbourne Market, in the month of September; it measured 13 inches.

This sort appears very distinct from *Scomber Australasicus* which has an air-bladder, and whose fins have—

Dorsal 9—1—12. Anal 2—11.

ZEUS.

The fish on which this genus was originally formed is known since the earliest ages, and the people on the shores of the Mediterranean give it the name of *Saint Peter's Fish.*

The first mention of an Australian species is due to Richardson ("*Erebus* and *Terror*"), but the only specimen he had seen was in such a bad state of preservation that he thought at first that it might belong to *Capros Australis* that he had himself previously described in the third volume of the "Zoological Transactions;" but in a later part of the "Fishes of the *Erebus* and *Terror*," he states that he has been able to examine a more perfect specimen from Western Australia, and he maintains his *Zeus Australis.* Dr. Gunther, in the second volume of his Catalogue, considers this sort as the ordinary European one, and, without the least doubt occurring in his mind, states that this inhabits the Mediterranean, Atlantic, and Australian seas. The fact that it had never been observed out of Europe, or at least south of the Canary Islands, and that the different species found at Madeira and the Cape of Good Hope were specifically different from the European one, might perhaps have led a Zoologist to admit the probability of a specific difference in sorts whose *habitat* is so remote. The Madeira sort is the *Conchifer* of Lowe, and the South African one the *Capensis* of Cuvier and Valenciennes; but it is true that these last authors say that Messrs. Webb and Berthelot have found the common sort at Teneriff.

ZEUS AUSTRALIS.

Zeus australis, *Richard.*, *Erebus and Terror*, p. 36-136 pl. xxxv., fig. 1.

(*The John Dorey.*)

Height of body two and a-half times in total length; head three times in the same; orbit five times in the length of the head; the lower jaw longer than the upper one, with the chin rather prominent. When the mouth is extended, the distance from the end of the lower jaw to the external angle of the orbit is contained three and a-half times in the total length; the præoperculum forms a slight angle at about one-third of its length; the operculum is prolonged in a flat, rounded angle, and in some specimens that part, being denudated of the skin, forms a strong bony point: the caudal portion of the operculum is covered with radiant striæ; the body is covered with very minute scales. The lateral line is strongly rounded to nearly two-thirds of the body; it from thence follows straight to the centre of the base of the caudal. Along the root of the spinous dorsal there is at the foot of each ray a spine, short, pointed, and directed backwards. Along the base of the second dorsal there are generally six, sometimes seven, plates, each bearing a strong, arched spine, directed posteriorly; and on the four last there is another spine, placed at the base of the others, shorter, and directed externally. Along the soft anal there is also a series of plates, numbering seven or eight; all, except the first, bearing an extra spine, like those we have already mentioned. At the foot of each of the three last spines of the first anal there is a rather strong, single spine, and on the space between the root of the anal and of the ventrals there is a double series of nine spines. The first dorsal is formed of ten spines, the three or four first of which are arched, and the others straight; the third and fourth are generally equal and longer than the others; the membranes between the first and second is lower than the others, and emits a filament about as long as the first spine; the membranes between the others also terminate in a filament; those between the second and third, and the third and fourth, are considerably

longer than twice the spine; the following are shorter. The second dorsal is formed of twenty-three soft rays; the caudal is truncated posteriorly of thirteen long rays, with one shorter one on each side.

The anal is divided in two; the first portion is formed of four strong straight spines; the membranes which unite these having each a pointed angle. The second anal is formed of twenty-two rays, it has the same form as its corresponding dorsal; the ventrals are large, being longer than the snout, when not extended; they are formed of a slender spine and of six rays; pectorals small, with fourteen rays.

The disposition of the colours is similar to that of the European sort: the general hue is a dark green, with yellow tinges on the sides of the head and body; the outer visible parts of the mouth are lilac colour; towards the centre of the fish there is a large rounded black blotch, surrounded by a wide circle, and below this the body is often variegated with purple and white. The first dorsal, caudal, first anal, and ventrals are green, with the spines or rays purple; the second dorsal and second anal are white and transparent, with their rays green; the pectorals of a light green; the eye yellow, with a purple tinge.

The *Dorey* is very rare on the Melbourne Market, and I have only seen three specimens of it, which were all taken in the month of August. It is considered a great delicacy.

Nota.—Professor M'Coy (*Report Intercolonial Exhib.*, 1866,) says that he has often caught in Hobson's Bay the *Cyttus Australis* of Richardson (*Capros*), which I have not yet met with.

HISTIOPTERUS.

This most singular genus was established in the "Fauna Japonica." Richardson, in his "Fishes of the *Erebus* and *Terror*," describes the Australian sort from a single head that had been brought from Tasmania.

HISTIOPTERUS RECURVIROSTRIS.

Histiopterus recurvirostris, *Richard.*, *Erebus* and *Terror*, page 34, pl. xxii.

(The Boar Fish or Bastard Dorey.)

The height is rather over three times and a-half in the total length; the head is three times and a-half in the same; the orbit is four and one-third times in the length of the head.

The general form is most singular ; the greatest height of the body is at the insertion of the head, and from this it goes on decreasing almost in a conical form to the base of the caudal ; the head is prolongated in a long muzzle, which is nearly half the length of the head ; this muzzle is scarcely broader at its base than at its extremity, and the nostrils are situated at its beginning. The chin is without asperities. The head is covered with bony plates, which are strongly striated, except on the cheeks ; in many places these *Striæ* are formed of punctures, and have a radiate disposition ; from a little under the eye the profile of the head ascends to the back by an oblique line, forming with the muzzle an angle of 45 degrees ; the teeth are very numerous, and are disposed on several lines, all nearly of the same form, but those in front being a little longer than the others, and sometimes slightly curved ; the series are also much more numerous in front than on the sides ; the suprascapula and the caracoïd are similarly striated ; the lateral line runs at about one-fourth of the height, and terminates at the centre of the tail ; it is very sinuous ; the body is covered with very fine scales, of which there are over one hundred and thirty on the lateral line.

The dorsal fin is composed of eight spines, the first of which is small, and measures about one-half of the diameter of the orbit ; it has no soft membrane ; the second has about twice the length of the first, and has a very narrow membrane not connected with the third spine ; this is very long, being over five times the length of the first ; it has a membrane which connects its base with the following spine, at about the height of the end of the first spine ; this membrane is very narrow in the remainder of its length, and is free in its terminal part ; the fourth spine is the longest of all, and has about eight times the length of the first, or nearly one-third of the total length of the fish ; its membrane has the same form as the precedent, but the portion which is adherent to the next spine is about twice the height of the other ; this fourth spine is curved in rather a sinuous manner ; the fifth spine is considerably shorter than even the third, and is straight ; this membrane has the same form as the other ; the sixth and seventh spines become shorter still ; the eighth and ninth equal to the seventh ; they are straight, and their membranes extend to about the following two-thirds of their length, and they have

only a small free portion; all these spines are very acute, and strongly striated.

The second portion of the dorsal, which is joined to the first, begins with a spine nearly one-third longer than the two last of the first part, and is followed by fifteen soft rays; the first being one-third longer than the spine, and the second twice its length; these two rays are simple, the following are all branched, the third and fourth are the longest of all, but they are very little longer than the second; from these the fin, which has rather a triangular form, goes decreasing rapidly; the last ray having only one-sixth of the length of the third.

The caudal is rather large and slightly emarginated posteriorly; it is formed of seventeen rays, all branched except the two external ones; on each side of the base are three very short rays, almost entirely covered by the scales of the tail. The anal is formed of three spines, rather curved and sharp; the first is the shortest and the third the longest; this is about twice the length of the first. The membranes which join these spines are low, and have their ends free; the soft part of the ray has the same triangular form as the dorsal; it is formed of ten rays, the two first being the longest, and the others decreasing rapidly; the last is double; the ventrals are very large; their spine is very strong, compressed, striated, arched, and very pointed. The first soft ray is longer than those of the spine, and has three-fourths the length of the head; the four others go on decreasing. The pectorals are rather long; they are formed of eighteen rays, the first of which is very short, being less than one-third the length of the second, which itself is shorter than the following.

The upper parts are of a greyish blue, and the lower ones of a dirty white; a broad band, arched and black, extends from the anterior part of the dorsal fin to the posterior portion of the anal. The membranes of the fins are black, with the spines of a rosy colour; the pectorals are almost of the latter colour, with a yellowish tinge; the base of the ventrals is blue. There is often a second dorsal band in front of the one we have mentioned, and of the same form, but it does not attain the inferior part of the body. The colours of the head are sometimes very pretty, the upper part being of a dark brown, mixed with purple, and the sides pink. The operculum has a broad longitudinal band on the cheeks, of a fine white colour; the eye is yellow, with an external brown circle, often interrupted.

This fish is not very rare; and is esteemed as food. It appears now and then in the Melbourne Market, in all seasons of the year. Average length, from 15 to 20 inches. I have several times found a large quantity of sand in its stomach.

I have, unfortunately, not been able to compare this sort with the Japanese species, the work in which the latter is described not being obtainable in Melbourne.

RICHARDSONIA.

The fish on which I propose to establish this new genus is very similar, in general appearance, to *Histiopterus*, but its dentition is very different. Here, we have two different sorts of teeth—those on the sides of the mouth being true molars, short, thick, globular, disposed on four irregular lines on the upper jaw, and on three at the lower; in front, there is a considerable number of other teeth, conical and pointed, disposed in a cluster on both jaws. The three first spines of the dorsal are very short, and the anal has only two spines.

RICHARDSONIA INSIGNIS.

D. 7—17. A. 2/10. C. 17. P. 18. V. 1/5.

The general form is almost exactly similar to the one of *Histiopterus*, but the body is more convex on the back, and the muzzle, formed by the anterior part of the head, is much shorter. The height of the body is a little less than the third of the total length; the head is contained nearly three and two-third times in the length of the body; the orbit is contained six and a-half times in the length of the head. The lips are very thick, and covered with tubercles; the chin is also very rough; the muzzle being very short, the slant upwards of the profile begins much nearer to the mouth, and the nostrils are situated on this snout; the posterior edge of the præoperculum and the one of the operculum are serrated; the edge of the first is also transversely striated; the bony plates, that cover a great part of the head, are very deeply striated; the *striæ* are disposed in radiations, and not punctated; the cheeks are covered with numerous, small, round scales, having each a tubercle in the centre. Suprascapula and caracoïd very strongly sulcated; the scales of the body are very small and numerous; they number about one hundred and ten on the lateral line, which follows the profile of the

back at about one-fourth of the height of the body; this line is very sinuous; it begins at the upper angle of the operculum, curves itself towards the back, presents several sinuosities, and extends towards the tail, but curls downwards before it reaches the root of the caudal; it is formed of a series of small ridges. The dorsal fin begins by three short and isolated spines, which go on increasing in length; the fourth spine is very long, compressed, and strong; it ends in a filiform appendice, which makes it as long as the body of the fish is high; its membrane is very narrow till a short distance from the body, where it extends to the following spine; this (the fifth) has the same form as the precedent, but its filament is not so long; its membrane extends to the following spine, at a greater height than the one of the fourth. These are followed by two more spines (making in all seven), which are shorter than the others, and the last has no filamentary appendice. The other part of the fin, composed of seventeen soft rays, is intimately connected with the other, and not sensibly higher; the rays go on decreasing insensibly in height to the end. The caudal is large, slightly emarginated; it is formed of seventeen long rays and of three shorter ones on each side; these are in a great part covered with scales. The anal has one very small spine and one very large one, the latter being about eight times the length of the other, and very broad; the soft rays are nine in number, the two first being a little longer than the second spine, and the others decreasing to the last. The ventrals have a very large, compressed, arched spine, having the form of a broad sword, and being two-thirds as long as the head, the first of the five soft rays is still a little longer than this spine. Pectorals rather large, of eighteen rays, the first not more than one-half the length of the second; the total length of the fin is equal to the one of the ventral. All the spines are strongly striated.

The general colour of the fish is of a dirty green, with the head and the anterior part of the back tinged with purple; the fins are of the latter colour, with the spines pink; the caudal is posteriorly bordered with green; eye brown.

I have only seen one specimen of this fish; it was brought to the Melbourne Market in November, 1871, from Western Port, and the fishmongers said it was the first time they had seen it. Total length, 25 inches.

NOTA.—Since writing the above, I have obtained a second specimen of this fish; it is larger, and measures near 33 inches. It was taken in April, at Queenscliff. The three first short spines of the dorsal have membranes, which connect them.

The name of *Richardsonia* has already been given by Mr. Steindachner to a genus of fishes, which Mr. Gill had previously called *Retropinna*, and this name being, of course, adopted, the one of *Richardsonia* becomes disposable.

DIMENSIONS OF LARGEST SPECIMEN.

	Inches.
Total length	$32\frac{5}{8}$
Greatest height	$9\frac{1}{4}$
Length of head	$4\frac{5}{8}$
——— from extm. of snout to ant. edge of orbit	5
Diameter of orbit	$1\frac{1}{8}$-$\frac{1}{2}$
Height of head at ant. edge of orbit	$4\frac{5}{8}$
——————— at centre of orbit	$5\frac{1}{2}$-$\frac{1}{2}$
——————— at posterior edge of orbit	$5\frac{1}{8}$
From post. edge of orbit to first dorsal spine	$4\frac{7}{8}$
—— base of first dorsal spine to base of fourth	$1\frac{3}{8}$-$\frac{1}{2}$
Total length of spinous dorsal	$5\frac{1}{8}$
——————— of soft dorsal	$9\frac{3}{4}$
Height of fourth spine	$3\frac{3}{4}$
From end of dorsal to base of caudal	4
Length of caudal at its centre	$2\frac{7}{8}$
——————————— at its sides	6
From base of caudal to anal	$3\frac{5}{8}$-$\frac{1}{2}$
Total length of anal at its base	4
Height of the second spine of anal	$3\frac{3}{4}$
Breadth of same	$\frac{5}{8}$
Height of first branched ray of anal	$4\frac{7}{8}$
From anal to base of ventrals	5
Breadth of ventral at its base	$1\frac{1}{4}$-$\frac{1}{2}$
Length of ventral spine	$4\frac{1}{2}$
Breadth of same	$\frac{5}{8}$
From base of ventral to base of pectorals	4
Height of first branched ray	2-2
——— of last	6
Greatest length of pectorals	$5\frac{1}{8}$
Shortest length of pectorals	$1\frac{3}{8}$-$\frac{1}{2}$

CARANGIDÆ.

"Body generally compressed, oblong, or elevated; covered with small scales or naked; eye lateral. Dentition variable. The infraorbital bones do not articulate with the præoperculum. The spinous dorsal less developed than the soft or than the anal, either continuous with, or separated from, the soft portion, sometimes rudimentary. The posterior rays of the dorsal and anal fins sometimes semi-detached. Ventrals thoracic, sometimes rudimentary or entirely absent. No prominent papilla near the vent. Gill-opening wide; generally seven branchiostegals and pseudobranchiæ. Air-bladder present; pyloric appendages generally in great number.

"Inhabitants of the seas of the temperate and tropical regions, many of the species having a very wide range."

Having followed the method of Dr. Gunther, I separate this family from *Scombridæ*, but I think the two ought to be united, as their only character is anatomic, and consists in the number of the vertebræ; the family of *Scombridæ* would then remain as it was established by Cuvier, with the exception of the *Trichiuridæ*, which form a most natural group.

SERIOLA.

The fish belonging to this genus are generally inhabitants of the tropical seas; but one sort is found in the Mediterranean, and one also on the eastern coast of Australia (Gigas, *Gunth.*) The following seems distinct:—

SERIOLA GRANDIS.

(The Yellow Tail.)

This remarkable sort plays a conspicuous figure in the Melbourne Market, particularly during the hottest months of the

year. It often destroys the fishermen's nets; but on some occasions it is a cause of considerable profit, as on one occasion it is reported that one hundred and forty-two were caught at once, which, at the price of five shillings a piece, would make over £28 for a single haul. They often, in calm weather, come very near the shore; but, as soon as the sea becomes agitated, they fly with rapidity towards the deep water.

The body is of a regularly long oval form; its height is about four times in the total length; the head is about four and one-third times in the same; and the orbit seven and one-third in the length of the head. This orbit is oval, and directed obliquely. The lateral line is sinuous, and marked on about one hundred and forty-three scales, but the number of transverse lines of scales is near two hundred. The posterior part of the lateral line, from the end of the dorsal and anal backwards, is elevated in a sort of keel or ridge. The scales of the posterior part of the body are larger and longer than the others. The first dorsal is formed of six very short spines, united by very low membranes; the last is hardly visible. The second dorsal has one short spine and thirty-five branched rays; the caudal has eighteen long rays and four shorter ones on each side; the anal has one spine and twenty branched rays; the pectorals are formed of twenty-three rays. The second dorsal and the anal have their first branched rays much longer than the others, which go on shortening to the eighth, from which they preserve about the same size. The anal is similar, and also falciform.

The upper parts are of a dark blue, and the others of a silvery grey. On each side there is a longitudinal yellow band; the fins are of a yellowish grey; the caudal is yellow, with the internal part obscure. The pectorals are nearly black, with their edge yellow; parts of the mouth of a fleshy colour; eye yellow.

The average size in length is from 30 to 40 inches, but some are much larger, and they sometimes weigh up to ninety pounds. It is moderately esteemed as an article of food.

Nota.—This sort must be nearly allied to Gunther's *Seriola gigas*, but appears to be quite distinct by the composition of its fins:—D. 8 1/24. A. 2 1/16.

CARANX.

The fish belonging to this genus abound in the tropical seas of both hemispheres, but in the temperate regions they are scarce. The Mediterranean has very few, and only one has been yet found on the southern coast of Australia, although several others are mentioned from the northern and western shores of that Continent.

CARANX GEORGIANUS.

Caranx georgianus, *Cuv. & Val.*, v. ix., p. 85.
——————— *Richard., Erebus and Terror, Fishes*, p. 135, pl. lviii., fig. 1.

(*The Silver Bream.*)

In the numerous specimens I have seen, the second dorsal numbers sometimes twenty-six and sometimes twenty-seven soft rays. Cuvier and Valenciennes give them twenty-eight or twenty-nine. They also count twenty-four at the anal, and I only find twenty-two and twenty-three. It is evident that these branched rays are subject to considerable variations in their numbers.

The colours in the fresh specimens are very beautiful, the upper parts being sometimes of a light celestial blue, and sometimes of a beautiful purple; the lower parts are of a silvery white, with bright iridescent tinges. Behind the operculum there is a black spot, and along the body extends a fine, longitudinal golden stripe. The dorsal fin is yellow, bordered with an obscure tinge; the caudal is yellow or grey, and the other fins diaphanous; the ventrals are rather pink.

In the old specimens the teeth are short, and many fall off. The eye is silvery.

This is a very common fish on the Melbourne Market, particularly in the cold months of the year. The large specimens are scarce. The average size is under 10 inches long, but some attain 23 and even 25 inches. It is considered good for the table, and appears to inhabit all the western and southern coast of New Holland.

TEMNODON.

Established by Cuvier on a fish remarkable by its first dorsal being very low, formed of eight feeble, continuous spines, but often difficult to see.

TEMNODON SALTATOR.

Temnodon saltator, *Cuv. & Val.*, v. ix., p. 225, pl. 260.
Scomber saltator, *Bl. Sch.*, p. 35.

(*Skip Jack.*)

This is one of the most common fish in the market; it is generally found at Melbourne of a small size, but I have seen one in September, which was 2½ feet in length.

Generally it is of a very bright silvery colour, with the upper parts of the body, head, and upper fins of a dark olive; the lower fins being white; the eye silvery or rather yellow.

This fish appears to be found in all the warm and temperate regions of the world, but it is not certain that several species are not mixed together. In some specimens I only see seven rays to the dorsal, and in a few the teeth are much more set apart than in others. I have also seen several times, at Melbourne, small specimens, called by the fishmongers *Snubgall*, which have the anterior part of the head shorter, and much more convex over the eye.

At the Cape of Good Hope, where it is very common, it is very often found of large dimensions. The young specimens are very brilliant, blue on the back, and green on the upper part of the head. The old ones are of a lead colour on the upper parts.

NEPTONEMUS.

Not one of the Australian fishes I have studied has caused such trouble to identify as this; it is common on the Melbourne Market, and it is not likely, therefore, that it has escaped the attention of collectors and naturalists, but in the most modern authors I can find no description that can apply to it.

It has much resemblance to the genus *Trachynotus*, and also with *Psenes*, but it differs from the first in having no first dorsal spine directed forwards, nor its two first anal spines separated

from the others. It agrees better with *Psenes*, but the limb of the præoperculum is striated and crenulated.

Dr. Gunther, in the second volume of his valuable catalogue, has established a genus *Neptonemus* amongst *Scombridæ*, to which he gives the following characters :—"Body oblong, compressed, covered with cycloïd scales of moderate size; the cleft of the mouth of moderate width; the snout obtusely conical; præoperculer margin obtusely crenulated; the first dorsal continuous, with some feeble spines; the second dorsal and the anal are more developed, with a scaly sheath at the base; no finlets; anal spines indistinct: pectorals much longer than the ventrals; a series of minute teeth in the jaws; palate toothless; branchiostegals six." One single sort from New Zealand (*Neptonemus Brama*).

In the second part of the "Proceedings of the Zoological Society for 1869," the same naturalist describes a second sort, under the name of *Dobula*, from Tasmania, and adds,—that on a further examination he finds that this genus belongs to the family of *Carangidæ*, and that there are two very small spines in front of, and at a short distance from the anal fin.

Almost all these characters applying to my sort, I have placed it in the genus *Neptonemus*; but it cannot be the New Zealand sort, which has one spine and twenty-nine rays at the second dorsal, nor the Tasmanian one, which has—First dorsal 7. Second dorsal 1/40. Anal 2 1/23.

NEPTONEMUS? TRAVALE.

(*The Travale*).

The body oblong, rather compressed, high, very curved over the eyes; the greatest depth is at the insertion of the second dorsal, and is contained two and two-thirds in the total length; the length of the head is not quite four times in the same; the snout is short; the eye large, placed at half the height of the head, and contained three and two-third times in its length; the lower jaw is longer than the upper one; the cleft of the mouth extends to the line of the anterior margin of the eye; the nostrils nearer to the end of the snout than to the orbit; upper part of the head naked; cheeks and operculum scaly; teeth numerous and fine, all equal, and dis-

posed on a single line at each jaw; interior of the mouth and tongue smooth; the posterior edge of the præoperculum is emarginated, with its angle quite rounded; this edge is armed with a number of short acute spines, each of which extends on the præoperculum, and gives it the appearance of being radiated; the operculum extends in a long, obtuse, flat point over the base of the pectorals, and its lower limb is sometimes rather denticulated; six branchiostegals; the body is covered with rather small scales, which are marked with concentric lines, and fall very easily; the lateral line runs over about ninety-three scales, and follows the profile of the back at about one-fourth of its height, and extends to the centre of the base of the caudal. On the dry specimens its posterior part appears carinated; below this line there is a deep longitudinal sulcated line, which extends all along the body at half of its height, and has the appearance of a second lateral line; the first dorsal fin is very low, and begins over the insertion of the pectorals; it is formed of six small feeble spines, connected together by a very low membrane; the second dorsal is much higher; it is composed of two spines and thirty soft rays; the first spine is much shorter than the second, but considerably longer than any of the first dorsal; the first rays of the dorsal are nearly twice as long as the second spine, but the following decrease until the seventh or eigth, when the succeeding ones maintain about the same height; the total length of the second dorsal is contained two and one-third times in the total length of the body, and the distance from its end to the centre of the caudal is contained five and one-third times in the total length; the caudal is deeply formed, and has twenty-one long rays and several short ones on each side; the most external of these does not attain the extremity of the fin; the anal, having the same form as the second dorsal, is formed of two very small conical spines, and of two slender ones; the first is much shorter than the second, and this is only one-half of the following rays; these number twenty-one; this fin is much shorter than the second dorsal, and is contained more than four times the length of the body; the ventral fin is rather small; it is inserted a little behind the base of the pectorals, and the space behind it and the beginning of the anal is equal to the length of the latter, and is formed of a rather long, slender,

straight spine, and of five rays; the pectoral is long, falciform, and formed of twenty-two rays; it extends to nearly the anus.

The general colour is of a blueish grey, with a copper tinge on the sides; the lower parts of the body are of a blueish white; the upper part of the head is of a copper-coloured brown; there is a broad purplish spot on the back, just behind the head; in this part the scales have a black margin; this spot extends laterally to the point of the operculum.; the lips are pink, as are also the root of the pieces of the operculum; the dorsal and caudal are rather obscure, with yellow tinge; the anal a little lighter colour; the ventrals of a rosy white; the pectorals are obscure, with their rays yellow; eye silvery. In some specimens the sides of the body are covered with very minute dark dots.

This fish is common on the Melbourne Market, particularly in the cold months of the year; it is used for food, and its average size is from 8 to 10 inches long; but I have one which measures 23 inches, and which only differs from the others by the absence of the sulcated line below the lateral one. The small spines of the operculum and præoperculum are worn out.

On the living specimens the body seems entirely covered with small tubercles, formed by the scales being very irregularly disposed. On the young ones the muscular fluxes are well marked on the sides of the body; the dark spot on the posterior part of the head is barely visible.

XIPHIIDÆ.

"Body elongate, compressed, naked, or covered with rudimentary dermal productions. Teeth none, or rudimentary. The upper jaw (ethmoid, vomer, and intermaxillaries,) much produced, sword shaped. One or two dorsal fins, without a distinctly spinous portion. Ventrals absent, or rudimentary and thoracic. Seven branchiostegals; pseudobranchiæ and air-bladder present. Pyloric appendages in great number.

"Mediterranean; open seas between or near the tropics."

The Sword Fish (*Histiophorus Gladius*) is stated to occur at Port Jackson, but has not, to my knowledge, been seen in the southern seas of Australia.

GOBIIDÆ.

"Body elongate, low, naked, or scaly. Teeth generally small, sometimes with canines. The infraorbital ring does not articulate with the præoperculum. The two dorsal fins separated, or more or less united, the spinous portion being always the less developed, and composed of flexible spines; the anal similarly developed as the soft dorsal; ventrals with one spine and five rays; sometimes both ventrals united into a disk. Gill-opening more or less narrow, the gill-membranes being attached to the isthmus; four gills; pseudobranchiæ. A prominent papilla near the vent. Air-bladder generally absent. Pyloric appendages.

"Carnivorous fishes, living at the bottom of the shores and of the fresh waters of the temperate and tropical regions. This family offers numerous instances of the fact that a part of the individuals of one and the same are entirely confined to fresh waters, whilst others live in the sea."

The principal genus of this group is *Gobius*, formed by Artedi; it comprises numerous species, generally of small size, and inhabiting all the temperate and tropical seas of the world.

GOBIUS BASSENSIS.

The anterior dorsal with six spines; scales large; no crest on the head; caudal fin very elongate, pointed. Body very elongate; its height contained seven and one-third times in the total length; head four and two-third times in the same; eye four and one-third times in length of head. Jaws about equal, the lower a little longer than the upper. Teeth on several rows at the lower jaw; no canines. No scales on the head nor on the nape of the neck; about thirty-eight scales on the lateral line; they are ciliated on their edge. Dorsals rather high, the second of eleven rays; caudal as long as the head, pointed, and formed of sixteen principal rays and of several others on each side; anal of eleven rays, which are, as those of the second dorsal, rather prolongated; pectorals about as long as the head, pointed, of fifteen rays, none of which are silk like.

The general colour is of a light grey, rather green on the back, and whitish on the belly. There are two longitudinal bands, which extend on the operculum, from behind the eye; the first strikes the upper edge of the root of the pectoral, and expands in a blotch; the other is placed lower; it is broader, and extends rather obliquely towards the lower side of the pectoral base. The two dorsals have a longitudinal narrow band, which runs at about one-third of their height from the back; the extreme edge of the second dorsal is yellow. The caudal has three or four transverse series of black spots, which only extend on its upper half; the two central rays are of an orange colour, ending in black; the anal and ventrals are white, without spots; the pectorals are also immaculate, but with a yellow tinge; the eye is silvery. On the lower side of the body, there is a longitudinal line of black blotches, which unite under the pectorals; some feeble, black transverse spots on the upper part of the body.

Only seen once, in February.

GOBIUS FRENATUS.

Gobius frenatus, *Gunther, Catal.*, v. iii., p. 39.

Anterior dorsal with six spines; scales numbering thirty-six on the lateral line; head without a crest; caudal fine, rather rounded, and sub-elongate. One canine tooth at each side of the lower jaw; no hard spines at the dorsal; body contained six and

one-third times in total lengh (to the end of the caudal). First dorsal with six spines; the second with one and ten rays; anal also with one spine and ten rays.

Of a light green, with two irregular, longitudinal, black bands on the operculum, which curve downwards below the eye. There are some light blue spots on the operculum, and a double longitudinal series of similar points on the body. The dorsals are green, finely edged with black; the caudal is the same with its base, reddish. The anal is of the colour of the body, but covered with very minute black dots; the ventrals are green, with a large black blotch; the pectorals are olive green, with the black bands of the head marked on their base.

Hobson's Bay. Length, $2\frac{3}{4}$ inches.

GOBIUS PICTUS.

Form elongate. First dorsal with eight rays, of which the second is rather longer than the others, and the last much shorter; the second dorsal formed of one spine and ten soft rays, of which the first is not quite as long as the others; caudal of twelve rays; anal of one spine and nine rays. The fins are large. The height of the body is five and a-half times in the total length; the head and operculum are covered with little, black dots. The lower jaw is longer than the superior; the scales of the upper part of the body are rather large, and brown on their edge.

The general colour is of a light lilac, with the inferior parts white. On the head are numerous, small, brown spots, and a dozen narrow, transverse, brown lines cover the back and extend on the sides. On the latter, there is a longitudinal line of black spots with terminals, and one (much larger) placed at the base of the caudal. On the latter, there are also two or three irregular black spots. The pectoral is yellow, and the ventrals white; the eye is yellow, with an external red circle. The first dorsal is white, with two broad, longitudinal, brown bands; the second dorsal is also white, diaphanous, with the spine brown, and the rays variegated with brownish red. This fin has a broad, transverse, terminal, brown band. The caudal has three transverse, broad, light red bands; the anal is white.

Found at St. Kilda. Length of specimen, 4 inches.

GOBIUS PULCHELLUS.

Form elongate. Height of the body four and three-quarter times in the total length; head three and a-half times in same. The first dorsal is rounded, with six rays; the first shorter than the second, the third rather longer than the others, and the following go on decreasing; the second dorsal has twelve rays. In both, the rays are much longer than the membranes. The caudal is rounded, with twelve rays; anal with one spine and nine rays, formed like those of the dorsal; ventrals large, united, pointed, with their lower rays much longer than the others. Pectorals rather large, extending to nearly the end of the first dorsal, of fifteen rays. Scales large; about twenty-three of them on the lateral line; eye moderately large, placed on the upper surface of the head.

General colour of a light grey, with the edges of the scales brown; lower parts of the body opal and white; head marbled with white spots; operculum covered with very minute black dots; front part of the head rather yellow. Three large round black spots on each side of the body—one opposite to the beginning of the second dorsal, the other to its end, and the third at the root of the caudal. There are also some undefined, transverse, white stripes on the sides of the body. Dorsal hyaline, marbled with brown spots, a black spot covering nearly the exterior half of the first membrane. Second dorsal with its rays spotted with brown, and yellow at their end. Caudal with the rays also spotted with brown, the spots forming five or six transverse lines of that colour. Anal large, white, with the rays yellow at their base, and black to almost their full extent; ventrals black, with their base white; pectorals rather yellow, marbled with white; their rays covered with very small, black dots. Eye yellow, with orange spots on its exterior edge.

Length, two and one-third inches. From Western Port. It is nearly allied to *Gobius Pictus*.

ELEOTRIS.

Formed by Gronovius, but much better characterised by Cuvier. This genus has numerous representatives in all the warm seas of the world; it inhabits the fresh waters, but extends

its *habitat* to the estuaries of large rivers. Richardson has described one sort from New Zealand; the following one appears in Dr. Gunter's first division (*Eleotris*, Bleeker); characterised by "Scales of moderate size, less than fifty in a longitudinal series; snout short, broad, flat, and depressed; the form of the head approaching that of *Ophicephalus*."

Amongst the eleven sorts contained in this division, there are only two which have seven spines at the dorsal; but it differs from both by the great size of its head, and also this being in great part without scales. The fish I describe here would, on account of the presence of teeth on the vomer, be a *Philypnus* for Cuvier and Valenciennes, but Dr. Gunther has not adopted this generic division.

ELEOTRIS NUDICEPS.

Height of body six times in the total length; head three and one-fourth times in the same; eye six and one-third times in length of head. Lower jaw considerably longer than the upper; head very large, very broad, being at its widest part one-half of its length. The mouth is very broad; the maxillary extends to the vertical from the centre of the eye; eyes considerably apart, the distance from one or other being nearly equal to the third of the length of the head. The teeth are very numerous, cardiform, those of the lower jaw larger than those of the other; they extend on the vomer and the palatines; the posterior part of the tongue is also covered with them. The head has no scales; its anterior part is very uneven, and its irregularities have the appearance of very minute scales; it presents several longitudinal ridges; but, from the transverse line running from the posterior edge of the eye to the end of the operculum, the skin is naked. Behind this begin very small scales, which extend to the base of the dorsal; the operculum and præoperculum are naked; the body is not so broad as the head. The scales are rather large, and number forty-seven on the longitudinal line; they are striated, and very finely ciliated on their edge. The first dorsal is rather rounded, of seven spines; the membrane of the last is attached to the body. The second is high, and formed of one spine and ten rays; they are all of the same length except the last, which is a little longer than the

others. The caudal is long, rounded, and formed of fourteen long rays and of several others on each side almost as long; the anal is as high as the body, of one spine and ten rays; pectorals two-thirds as long as the head, and of eighteen rays.

The body is of a light olive green, with the lower parts of a blueish white; the head almost entirely black in the adult; the edge of the scales is rather obscure; the dorsals are generally green; the first has sometimes two series of reddish spots, and sometimes it is white, with two longitudinal broad bands, more or less carmine, the coloured part being covered with very minute black dots. The second dorsal has three or four longitudinal series of red dots, which sometimes unite, and form longitudinal bands. The caudal has numerous transverse series of small, red spots; the ventrals and anal white; eye gilt.

The young specimens have the head less inflated.

This fish is very common in the lower Yarra; they are very voracious, and have often in their broad mouth, and partly digested, fishes as large as themselves, and generally of their own species. Sometimes pieces of wood are found in the same way, and held fast by their teeth.

Mr. Krefft has described, in the "Proceedings of the Zoological Society," 1864, p. 183, four Australian sorts of *Eleotris*, one of which (*E. Grandiceps*) may be this. There is one ray less at the second dorsal and at the anal, but this may depend on the different ways of counting the last one. It is from the Clarence River. The principal reason for not uniting my sort with his is, that he says,—that the pectorals attain the base of the anal; while in my specimens they do not.

BATRACHIDÆ.

"Habitus cottoid; skin naked, or with small scales; the system of muciferous channels well developed. Teeth conical, small, or of moderate size. The spinous dorsal very short, the soft and the anal long. Ventrals jugular, with two soft rays;

pectorals not pediculated. Gill-opening a more or less vertical slit before the pectoral, rather narrow. Gills, three; pseudobranchiæ absent; an air-bladder.

"Carnivorous fishes, living on the bottom of the coasts of the tropical regions, several species advancing into the temperate seas."

No sorts have yet come under my notice.

PEDICULATI.

"Head and interior part of the body very large, without scales. Teeth in cardiform or villiform bands. The spinous dorsal either composed of a few, more or less, isolated spines, or entirely absent. Ventrals jugular, with four or five soft rays, absent in *Ceriatias;* the carpal bones prolonged, forming a sort of arm for the pectorals. Gill-opening reduced to a small foramen, situated in or near the axil. Gills two and a-half, three, or three and a-half; pseudobranchiæ absent.

"Carnivorous fishes, inhabiting the seas of the temperate and tropical regions."

Several sorts of this family, particularly of the genus *Chironectes,* are found in the Tasmanian and South Australian seas; but I have not examined any in a fresh state.

BLENNIIDÆ.

"Body elongate, low, more or less cylindrical, naked, or covered with scales, which are generally small. The infraorbital ring does not articulate with the præoperculum. One, two, or three dorsal fins occupying nearly the whole of the back. The spinous portion, if distinct, being as much developed as the soft, or more; sometimes the whole fin composed of spines, anal fin long; ventrals jugular, composed of a few rays, and sometimes rudimentary or entirely absent. Air-bladder generally absent; pyloric appendages none.

"Carnivorous fishes, inhabiting the bottom of the shores of all regions; several inhabiting fresh waters."

Sorts of these will certainly be found in the Straits of Bass.

CLINUS.

Formed by Cuvier, and containing a considerable number of rather small fishes, inhabiting almost all the seas of the world. I have only seen one sort in Victoria.

CLINUS DESPICILLATUS.

Clinus despicillatus, *Richard., Zool. Journ.*, 1839, p. 90.
———————— *Richard., Trans. Zool. Soc.*, v. iii., p. 128, pl. 6, fig. 2.

The fish I consider as belonging to this sort has its lateral line interrupted in its anterior part. The height is four and one-third times in the total length; and the head four and one-fifth times in the same. The dorsal is formed of two fins, as in *Cristiceps*,

but they are united by their membrane; the first is composed of three spines and the second of thirty-six, four or five of which are branched rays, but it is difficult to well indicate their number, as they seem to pass gradually one to the other; the caudal has twelve long rays; the anal twenty-six rays and two spines. The pectorals have twelve rays, and the ventrals three, the centre one much longer than the other two, and divided almost to its base.

The colour is subject to much variation; in one specimen, it is green, with the lower parts of the head and the belly yellow; the latter is covered with minute black points; the præoperculum presents numerous transverse lines, formed of red and black spots, which are disposed in rather a radiant way. On the back part of the second dorsal the rays are spotted with red; the caudal is yellow, with its rays marbled with red, and near its base are two rounded, brown-red spots; the anal is yellow, marbled with purple, and the prolonged parts of the rays are red. The ventrals and pectorals are yellow; the last has six or seven transverse lines of carmine spots; the lower portion of the operculum and the throat are covered with carmine points; the eye is green, spotted with black, and surrounded by an external white ring.

In other specimens the colour is brown, marbled with blotches of a rather darker colour. Over the eye, there is a small plumiform tentacle, of a green colour.

I have only seen few specimens of this fish, which appears to belong to *Cristiceps*, at least as much as does *Argentatus*.

CRISTICEPS.

Cuvier and Dr. Gunther separate from *Clinus*, and under the above name, the species which have a first dorsal fin separated from the second, and placed generally more forward than in the other sorts.

This is evidently an artificial character, and these species ought only to form a division in the genus *Clinus*. The greater number of the sorts are found in Australia. Several have been described by Cuvier, Valenciennes, and Dr. Gunther, but the only two I have seen at Melbourne appear different from all.

In his extraordinary tendency to consider, as belonging to the same species, fishes found in the most remote parts of the world,

Dr. Gunther places with the Mediterranean *Clinus Argentatus*, Cuv. & Val., specimens from Australia having constantly twenty-three soft rays to the anal fin, instead of nineteen or twenty. Admitting, at the same time, that some zoologists may consider them as forming a distinct species, he proposes for them, in a note, the name of *Antinectes*. This naturalist must certainly entertain very particular ideas on the constitution of the species in Zoology.

CRISTICEPS MULTIFENESTRATUS.

Form elongate; length of body four and one-eighth in the total length; head four times in the total length; orbit of the eye four and five-sixths in the length of the head; there is a rather long and arborescent tentacle over the second, a very small simple one on the snout; scales very minute; the lower jaw is considerably longer than the upper one; first dorsal placed over the end of the præoperculum, formed of three spines; the two first are longer than the other one, and placed much nearer one to the other than to the third; the space between this fin and the second dorsal is equal to the transverse diameter of the eye. This dorsal is formed of thirty spines and four rays; it grows a little higher as it goes towards its extremity, which is rounded; the spines and rays are very strong; the caudal is rounded, formed of nine rays and a complex short one on each sort; the membranous dorsal extends to the end of the rays; the anal has the same form as the second dorsal; the rays are free at their end for nearly one-third of their length; there are two spines and twenty-three rays; the ventrals are formed of three rays, united in a membrane for more than one-third of their length; the central one is the longest; the pectorals have twelve rays, much longer than the membranes; the last ray of the dorsal is fixed by a membrane to the tail, but does not extend to the base of the caudal; the last of the anal is similar, but does not extend so far as the other.

This fish is of a handsome purple colour, with large black, rounded blotches, forming a line on the back and another on each side, the latter being the smallest. Between them are numerous short, irregular, white, interrupted longitudinal lines. The belly is of a lighter and rather pink colour, with large, white, oval

blotches. The head is punctured with red, and has two irregular longitudinal lines on the præoperculum; the second is rather oblique; the lips are marbled with light brown, and on the sides of the head are five or six round blotches, of a fine silvery hue. The dorsals and anal are transparent, covered with purple-brown, opaque lines, forming a sort of trellis work; the rays are brown, marbled with yellow; those of the caudal are similar, and that fin is bordered with orange, as is also the soft part of the dorsal. The ventrals are striped yellow and purple; the pectorals are dark; the eye is pink, with an external series of red spots.

I have only seen two specimens of this sort; the largest measures $10\frac{1}{2}$ inches.

This sort must have some resemblance to Forster's *Blennius Fenestratus*, but this is included by Cuvier and Dr. Gunther in the genus *Tripterygium*.

CRISTICEPS FORSTERI.

The body is very elevated in its anterior profile, and like gibbous over the head; this bears a single, simple bifid filament over the eye. The height is contained four and a-half times in the total length; the head four and one-third times in the same; eye four and one-fourth times in the length of the head. The lips are thick and prominent. The first dorsal begins in front of the end of the operculum; it is high, and formed of three spines. The second is separated from it by a small space, and is formed of twenty-nine spines and four rays; these are rather higher than the spines; the caudal is rounded, and formed of nine long rays; the anal of twenty-six; it is low at its anterior part, and goes on increasing towards its end, which is rounded; the rays are considerably longer than their membranes; its last ray is fixed by a membrane to the tail, but at considerable distance from the base of the caudal; the last one of the dorsal is similar, but extends a little further backwards; the ventrals have two rays, the external short, the other long and bifurcated; the pectorals have twelve rays.

The general colour is green, with the sides of the head and the anterior part of the lower side of the body of an ochre yellow; the lips are purple, and the lower portion of the præoperculum carmine; the dorsals, caudal and anal are green, with

the spines and rays purple; the ventrals yellow, and the pectorals purple. Between the base of the pectorals and ventrals are two rounded white spots; several others, oblong and transparent ones, are seen on the fins. On the only specimen I have seen they are disposed as follows:—on the second dorsal a fenestrated, rounded spot between the fourth and fifth, the ninth, tenth, and eleventh, the twentieth and twenty-first, the twenty-sixth and twenty-seventh, and the thirty-second and thirty-third ones at the base of the caudal; on the anal one between the seventeenth and eighteenth, and the twentieth and twenty-first, one covering about all the twenty-third, twenty-fourth, and twenty-fifth, and between this and the last ray there are two, one placed over the other; near the base of the pectorals there is a transverse line, formed of three similar spots; eye green.

One single specimen seen at Melbourne in the month of January; it was about six and a-half inches long.

ACANTHOCLINIDÆ.

"Body elongate, low, compressed; covered with small scales. One dorsal fin, occupying nearly the whole of the back, by far the greater part being composed of spines; anal fin long, with the number of the spines exceeding that of the rays; ventrals jugular, composed of a few rays. Dentition complete. Four gills, pseudobranchiæ. Air-bladder, none; pyloric appendages, none. Coasts of New Zealand. Carnivorous fishes."

TEUTHIDIDÆ.

"Body compressed and oblong, covered with very small scales. Lateral line continuous; tail not armed. Eye lateral, of moderate size. A

single series of trenchant incisors in the jaws; palate smooth. One dorsal fin, the spinous portion being the more developed; anal with seven spines. Ventral fins thoracic; pseudobranchiæ well-developed.

"Herbivorous fishes, inhabiting the tropical seas of the East Indian region, and the western parts of the Pacific."

Several *Teuthis* are found in the Australian seas, but I have not yet been able to procure any.

ACRONURIDÆ.

"Body compressed, oblong or elevated, covered with minute scales. Lateral line continuous; tail generally armed with one or more bony plates or spines, which are more developed with age, and frequently absent in very young individuals. Eye lateral, of moderate size. Mouth small; a single series of more or less compressed, sometimes denticulated, sometimes tapering, incisors in each jaw; palate smooth. One dorsal fin, the spinous portion being less developed; anal with two or three spines; ventral fins thoracic. Pseudobranchiæ well developed; air-bladder present, forked posteriorly. Intestines with more or less numerous circumvolutions.

"Seas between the tropics. Herbivorous fishes."

Nota.—*Acauthurus* presents several sorts, particularly on the northern coasts of Australia, but it is not likely that any will be found extending their *habitat* so far south as the Victorian Sea.

NANDIDÆ.

"Body oblong, compressed, covered with scales. Lateral line interrupted. Dorsal fin formed by a spinous and a soft portion, the latter being the less developed; anal fin with three spines, and with its soft portion similar to the soft dorsal. Ventral fins thoracic, with one spine and four or five soft rays. Dentition more or less complete, generally feeble. Five or six branchiostegals; gills, four or three and a-half; pseudobranchiæ present in the marine, absent or hidden in the fresh-water genera. An air-bladder. No superbranchial organ.

"Carnivorous fishes."

I have observed no sorts of these fishes in Victoria, but *Plesiops cœruleo-lineatus* and *Trachinops Tæniatus* are found on the Australian coast.

ATHERINIDÆ.

"Body more or less elongate, subcylindrical, and covered with scales of moderate size; lateral line indistinct. Cleft of the mouth of moderate width, with the dentition feeble. Eye lateral, well developed. Gill-opening wide; four gills; pseudobranchiæ; five or six branchiostegals. Two dorsal fins, the spine of the first feeble; the second of moderate length; anal like the soft dorsal, or rather longer. Ventral fins abdominal, with one spine and five rays. Vertebræ very numerous in the caudal and abdominal portions.

"Carnivorous fishes, inhabiting the seas of the temperate and tropical regions; several species entering or living in fresh water."

The species of *Atherina*, and particularly of *Atherinichthys*, seem to be rather numerous on the Australian coasts. I propose here a new genus, *Atherinosoma*, which, if it does really belong to the family, would, on account of its dentition, oblige me to modify its characters.

ATHERINICHTHYS.

Separated by Dr. Bleeker from *Atherinus* on account of the snout produced, and the cleft of the mouth not extending to the orbit. The general aspect is the same.

ATHERINICHTHYS MODESTA.

Height of body contained five and a-half times in the total length, or five times to the base of the caudal; head four and a-quarter times in the same; eye three times in the length of the head. Muzzle considerably shorter than the diamater of the eye; mouth extensible; scales large—about forty on the lateral line. The first dorsal of six spines; second of one spine and nine rays; anal of four spines and ten rays; caudal of nineteen rays.

The distance from the anterior root of the first caudal to the extremity of the snout is equal to that from its posterior edge to the beginning of the caudal; from the same anterior edge of the first dorsal to the anterior edge of the second the distance equal to that between the anterior edge of the second and the base of the caudal; the height of the first dorsal is equal to the distance from the extremity of the snout to the centre of the eye; the caudal is strongly bilobed; the anal is inserted below the second dorsal, or a trifle in front of it, and the ventrals a little in advance of the first dorsal; the pectorals are considerably longer than the height of the dorsal; they have twelve rays. A rather broad, longitudinal, silvery band on the sides.

The general colour is of a light greyish green, with the edges of the scales rather brown or even black on the upper parts of

the body; the dorsals, caudal, and pectorals yellow; anal and ventrals white; eye silvery.

Common in Hobson's Bay and the lower Yarra. Length from 2 to 3½ inches.

ATHERINICHTHYS PICTA.

Height of body six and a-half times in the total length, or five and a-half times to the base of the caudal; head four times in the total length; eye three and one-fifth times in length of head. Body elongate; scales large—about forty-four on the longitudinal series; snout considerably shorter than the diameter of the eyes. 1st Dorsal 8; 2nd 10. A. 11. C. 17.

The two dorsals are placed like those of *Modesta;* the anal a little in front of the dorsal; the ventrals under the first dorsal; caudal long, more emarginated than bifurcated, the difference in length between the middle rays and the side ones not being over one-quarter of their length.

Of a pretty light green, with the lower parts of the body white and silvery. A broad, longitudinal, red band on each side; fins diaphanous; caudal yellow; eye silvery; a few very minute black points on the sides of the head.

Only seen once, at Capt. Sinnot's Dock, on the lower Yarra; under 2 inches long.

ATHERINICHTHYS CEPHALOTES.

Height of body seven and one-third times in the total length; head three and two-third times in the same, or three and one-fourth times to the root of the caudal; eye three and one-third times in the length of the head; this is very large; the lower jaw considerably in advance of the upper one; teeth in both jaws, those of the lower rather longer than the others; they are all arched and pointed. The mouth is large, but the cleft of the mouth does not extend to the orbit; the maxillaries attain one-third of the orbit's length; the eye very large. The body is covered with very large scales; these numbering forty-two or forty-three on the lateral line, which is distinctly marked. The body goes tapering towards the tail; the first dorsal begins almost at the middle of the body, but a little nearer to the snout than to the base of the tail; it is formed of seven feeble spines, of which the first is considerably shorter than the others. The

second dorsal is situated at a considerable distance behind the first, this distance being contained three times in that to the extremity of the snout; it is formed of one feeble spine and eight rays. These two dorsals are well developed; the caudal is bifurcated, and formed of sixteen long rays and some short ones; the anal is inserted below the second dorsal, but it is much longer; it is formed of one spine and twelve rays; the ventrals are inserted a little in advance of the first dorsal. The pectorals are rather large, equal to the snout up to the anterior margin of the eye; they are formed of thirteen rays.

The back is of a light green, with the belly white, and a broad, longitudinal, silvery band on each side; the head is of a rather olive colour; the dorsals grey, the second of these has a yellow tinge on its external part; the caudal and pectorals are yellow, and the lower fins white.

On the living specimen, there was a rather large, round, black spot on the caudal, near its base; but it has entirely disappeared after having been preserved in spirits.

I have only seen one specimen, which was taken in the month of August. It is nearly 6 inches long.

Nota.—Since then, I have seen a second specimen, which had only a very faint trace of the caudal black spot.

ATHERINOSOMA.

General form of *Atherina*. Cleft of the mouth small, and not extending to the eye; longitudinal silvery band on the sides; but the teeth are large on each jaw, hooked, and placed on several rows. Also on the vomer and palatines there are numerous tuberculous teeth, which extend on all the upper surface of the interior of the mouth, and also on the tongue. The mouth is not, or at the utmost only slightly, extensible. Two dorsals.

This new form will render it necessary to rectify the characters of *Atherinidæ*, or to form for it a new family.

ATHERINOSOMA VORAX.

Height contained seven times in the entire length; head four and a-half times in the same; eye contained three and one-third times in the length of the head. The lower jaw is sensibly longer than the upper one; snout considerably shorter than the diameter

of the eye; operculum and præoperculum entire. Body elongate, covered with large scales, numbering about thirty-six on the longitudinal line. First dorsal rather rounded, formed of six spines; its posterior membrane attached to the back. This fin is inserted nearer to the muzzle than to the root of the caudal. Second dorsal of one spine and nine rays; its length is equal to the distance from the muzzle to the posterior edge of the eye, and the space from its end to the base of the caudal is about one and a-half times the same distance. The height of this fin is about equal to that of the body at the point of its insertion. The caudal is strongly bifurcated, formed of seventeen long rays and of several others on the sides; the anal is formed of one spine and eight rays; it is inserted below the second dorsal; ventrals a little in front of the first dorsal, they are rather large, and composed of one spine and five rays. Pectorals of twelve rays. The upper part of the head is covered with large scales up to the centre of the eye; the anterior part with longitudinal lines.

I have only seen one specimen, caught at Cape Shanck by Dr. Howitt; it appears, after having been in spirits, of a light green, with the lower parts white and silvery; a broad longitudinal band, more brilliant, extends on the sides; upper fins and caudal yellow; anal and ventrals white. Length, 3 inches.

MUGILIDÆ.

"Body more or less oblong and compressed, covered with cycloid scales of moderate size; lateral line, none. Cleft of the mouth narrow, or of moderate width, without or with feeble teeth. Eye lateral, well developed. Gill-opening wide; four gills; pseudobranchiæ; five or six branchiostegals; two short dorsal fins, the anterior with four stiff spines; anal a little longer than the dorsal opposite; ventral fins with one spine and six rays,

abdominal, suspended from the elongate carcoid bone. Number of vertebræ twenty-four.

"Fresh waters and coasts of all temperate and tropical regions. Feeds on soft organic substances, or very small animals."

I have only found one single sort of true *Mugil* in Victoria, but several others inhabit the eastern coast.

MUGIL.

As this genus is now restricted, I only know, as I have just said, of one sort in Victoria.

MUGIL WAIGIENSIS.

Mugil waigiensis, *Quoy & Gaim., Exped. Freycinet, Fish.*, p. 337, pl. 59, fig. 2.

(*Sand Mullet.*)

Height four and two-third times in the total length; head four and eight-tenth times in the same; breadth of head one and a-half times in its length; orbit four and one-third times in the length of the head. Head very thick and very broad, entirely covered with large scales; teeth rather large for the genus, numerous, and disposed on a line on each jaw; scales large, numbering about thirty-seven on the longitudinal line, and twelve on the transverse one. Each scale has a longitudinal sulcate, which extends to about two-thirds of its uncovered part; the sides of the scales are lightly and longitudinally striated; their posterior part more strongly, and rather in a radiated disposition; their external edge has concentric lines. The first dorsal is formed of four spines, the three first being the longest, and joining each other at their base; the second dorsal is formed of one spine and eight branched rays; the caudal is strongly emarginated, of fourteen rays, of which the external ones, in particular, are in great part covered with small scales; the anal is formed of three spines and eight soft rays; the ventrals are situated on the line of the end of the pectorals; their spine is long; the pectorals have their first rays rather long, and their posterior edge is strongly

emarginated below these; their number is fifteen, with their first third, at least, covered with small scales.

The upper parts are of a very dark blue, and the lower of a dirty white; the lips are pink; the eye yellow; the sides of the head have a copper tinge; the base of each scale of the body, being of a bright silver colour, gives the fish the appearance of having longitudinal lines; the fins are yellow, with their base blue and their extremity black; the ventrals are whitish.

This sort attains large dimensions. I have one specimen which is about 21 inches long. It is much esteemed as food.

AGONOSTOMA.

Genus formed by Dr. Gunther on the sorts of *Mugil*, which have an elongate muzzle and teeth on the vomer. The first of these mentioned by authors was observed by Forster, and called by him *Mugil Albula*. Cuvier and Valenciennes changed this name to *Mugil Forsteri*. Richardson ("Zoological Transactions") placed this sort in the genus *Dajaus*, of which it has most of the characteristics, and describes another sort under the name of *Diemensis*. It has been stated that the common *Mullet* of the Melbourne Fish Market was the *Agonostoma Forsteri;* but this is a New Zealand sort, and the fish alluded to belongs to *Diemensis*. I know that this is in conformity to the opinion of Dr. Gunther, who, in his Catalogue, unites the two sorts, but the difference in the numbers of the fine rays separates them clearly.

AGONOSTOMA DIEMENSIS.

Dajaus diemensis, *Richard., Zool. Trans.*, v. iii., p. 123.

———————— ———— *Erebus and Terror, Fishes*, p. 37, pl. 26, figs. 1, 2.

(*The Mullet.*)

Richardson gives the following numbers to the rays:— D. 4—10. A. 3 /12. C. 14 5/4. P. 15. In most of the Melbourne specimens, I find one more branched ray to the anus, that is, thirteen; but in a few I find also twelve.

The upper parts are of a greyish blue, with green tinges on the body, and brown on the head; the lower parts of the body are silvery; the upper and pectoral fins are light grey; the

caudal is yellow, bordered posteriorly with black ; the anal white ; there are very faint longitudinal lines on the sides ; eye gilt.

Very common all the year round ; they rarely exceed 12 or 13 inches. This is a sea sort, and *Forsteri* is said to inhabit the fresh waters of New Zealand.

AGONOSTOMA LACUSTRIS.

(*Lake Mullet.*)

Height five and a-half times in the total length ; head five times in the same ; orbit four and a-half times in the length of head. This latter is not so pointed as in *Tasmanicus ;* the teeth are deficient at the lower jaw, but very visible on the upper one, as also on the palatine and vomer. The præoperculum has four lines of rather large scales. The body is elongate, covered with rather large scales, of which sixty-two are on the longitudinal line and sixteen on the transverse one ; they do not fall so easily as in most *Mugilidæ ;* most of them have a very short longitudinal ridge, not extending over more than one-third of the visible portion of the scale, and forming fifteen longitudinal series ; they have radiated *striæ* on their posterior part, and their edge is slightly ciliated. The first dorsal is formed of four spines, of which the two first are joined at the base, and the third is a little more apart ; the second dorsal is composed of nine soft rays. The caudal has fourteen long rays and four short ones on each side ; it is rather strongly emarginated, the ends terminating in points ; the tail is covered with minute scales, which extend on the first part of the membranes, and even on the external rays. Anal with three spines and twelve rays—the first spine very short, the second one-half of the third ; the fin is strongly emarginated ; the spine of the ventrals is long and slender ; the pectorals have fourteen rays.

Of a greyish green on the upper parts ; white on the lower ; each scale with an obscure margin ; a reddish spot on the back part of the head ; the upper part of the head and lips of a dark violet colour ; fins greyish ; caudal with a black posterior margin ; eye of a very bright orange yellow.

Brought to the Melbourne Market from the Gipps Land lakes. Scarce.

TRICHONOTIDÆ.

"Body elongate, subcylindrical, covered with cycloid scales of moderate size. Eyes directed upwards. Teeth in villiform bands. The infraorbital ring does not articulate with the præoperculum. One long dorsal fin, with articulated, not branched rays, and without a distinct portion; anal long; ventrals jugular, with one spine and five rays. Gill-opening very wide, seven branchiostegals; pseudobranchiæ. No prominent papilla near the anus. Air-bladder and pyloric appendages absent. Caudal vertebræ much more numerous than those of the abdominal portion."

"Carnivorous fishes, living near the shores of the East Indian Archipelago and of New Zealand."

No sorts have yet been observed in the Victorian Sea.

GOBIESOCIDÆ.

"Body rather elongate, anteriorly depressed, naked. Teeth conical or compressed. A single dorsal fin on the tail without spinous portion; anal short; ventrals widely apart from each other, with one spine hidden in the skin and four (five) rays. A large adhesive apparatus between them, the posterior portion of which is suspended on the caracoid bones, which are partly free, in the axil of the pectoral fins. Three gills or three and a-half. Air-bladder absent.

Intestinal tract short; wide, without pyloric appendages.

" Carnivorous fishes. Most of the species live in the seas of the temperate regions of both hemispheres; two are known to inhabit seas between the tropics."

Several are described from Tasmania and Swan River; but I have not yet observed any at Melbourne.

CENTRISCIDÆ.

"Form of the body compressed, oblong or elevated; the anterior bones of the skull are much produced, and form a long tube, terminating in a narrow mouth. Teeth none. Body either covered with a cuirass or with non-confluent ossifications. Scales none, or small. Two dorsal fins; the spinous short, and with one of the spines strong; the soft and the anal of moderate extent. Ventral fins small, without spine, or rudimentary, abdominal. Branchiostegals three or four; air-bladder large; four gills and pseudobranchiæ. Pyloric appendages none; intestinal tract rather short.

" Mediterranean and northern shores of the Atlantic, eastern coasts of Africa, coasts of China, Japan and Australia."

Centriscus Humerosus inhabits Australia; but I have not seen it.

FISTULARIDÆ.

"Fishes of greatly elongate form; the anterior bones of the skull are much produced, and form a long tube, terminating in a narrow mouth. Teeth small. Parts of the skeleton and dermal productions form external mails. Scales none, or small. The spinous dorsal fin is either formed by feeble isolated spines, or entirely absent; the soft dorsal and anal of moderate length; ventral fins abdominal, composed of six rays, without spine; they are separate from the pubic bones, which remain attached to the humeral arch. Branchiostegals five; air-bladder large; four gills; pseudobranchiæ. Pyloric appendages in small number; intestinal tract short.

"Tropical parts of the Atlantic and of the Indian Ocean."

Fistularia Serrata inhabits Port Jackson and Northern Australia, but I do not think it extends to the southern coast of Australia. It is figured in "White's Voyage to New South Wales," pl. 64, fig. 2.

Order II.

ACANTHOPTERYGII PHARYNGOGNATHI.

"The inferior pharyngeal bones are coalesced, with or without a medium longitudinal suture. Part of the rays of the dorsal, anal and ventral fins not articulated, forming spines. Air-bladder without pneumatic duct."

POMACENTRIDÆ.

"Body compressed, more or less short, covered with ctenoid scales. Dentition feeble; palate smooth. The lateral line does not extend to the caudal fin, or it is interrupted. One dorsal fin, with the spinous as well developed as the soft, or more. Two, sometimes three, anal spines; the soft anal similar to the soft dorsal. Ventral fins thoracic, with one spine and five soft rays. Branchiostegals five, six, or seven; gills three and a half; pseudobranchiæ and air-bladder present. Pyloric appendages in small number. Intestinal tract of moderate length. Tropical seas."

GLYPHISODON.

Genus formed by Lacepede, but much better characterised by Cuvier. Dr. Gunther changes the name in *Glyphidodon;* but I do not think that these so-called rectifications can be admitted.

GLYPHISODON VICTORIÆ.

Glyphisodon victoriæ, *Gunther, An. and Mag. Nat. History*, v. ii., 1862, p. 116.

The height of the body is contained twice in the length, up to the end of the dorsal, and two and one-half in the total length. The head is four times in the same; the orbit is three and one-third in the length of the head, and it is not quite as long as the snout; teeth small, rather regularly placed; they are elongate and rather broader in the middle than at their extremity, which is rounded; the head is covered with scales, those of the operculum small, on six rows; a denudated space round the margin, covered with reticulations, which are transverse on the poste-

rior edge, but become longitudinal below the angle; the operculum covered with scales, about one-fourth smaller than those of the middle of the body, but ciliated like them; the body is as thick as the length of the head; it shows twenty-eight scales on the longitudinal line, and several smaller ones near the root of the caudal; on the transverse series the lateral line runs over the fourth, and I count eight below it. The dorsal fin is formed of thirteen spines, but the soft rays vary from fifteen to seventeen; the first spine is short, the others nearly equal one to the other; the fourth is rather longer than the anterior ones, and the following are about equal to it; the soft dorsal is nearly twice as high as the spinous one; the caudal is very strongly bilobated, with the lobes rounded; it is formed of fourteen rays; the anal is rounded, and composed of two spines and of fifteen or sixteen rays; the second spine is about twice as long as the first; ventrals rather large, formed of one long spine and of five branched rays; they are nearly three-quarters as long as the head, and from their end to the base of the anal is a space equal to about one-half of their length; pectorals large, formed of nineteen rays. Almost all the spinous part of the dorsal, the three-quarters of the branched one and of the anal, and also the two-thirds of the caudal, are covered with small scales; these extend also on the base of the pectorals. The eye is yellow.

The colour is nearly black, with a purple tinge on the sides of the head and on the spines of the fins; the membranes of the dorsal have a yellow hue, but these colours seem subject to much variation, as one specimen, a female, was of a light purple colour, with the central parts of the body of a light brown, with the middle of the scales yellow; the belly was reddish; the fins yellow; a broad purplish white stripe extended round the operculum.

This is not a common sort on the Melbourne market, but a specimen appears now and then, particularly in the months of September, October, and November. It does not seem to have actually a vernacular name, but Dr. Gunther says it is called *Rock Perch*, which is not used now. I could not ascertain if it was fit for the table.

Length, 8 to 10 inches.

LABRIDÆ.

"Body oblong or elongate, covered with cycloid scales. The lateral line extends to the caudal, or is interrupted. One dorsal fin, with the spinous portion as well developed as, or more, than the soft; the soft anal similar to the soft dorsal. Ventral fins thoracic, with no spine and five short rays. Palate without teeth; only one lower pharyngeal line without medium suture. Branchiostegals, five or six; gills, three and a-half; pseudobranchiæ and air-bladder present. Pyloric appendages none; stomach without cæcal sac.

"Marine fishes, inhabiting the seas of the temperate and tropical regions."

LABRICHTHYS.

These fish were separated from *Labrus* by Dr. Bleeker. The sorts are numerous in the Australian waters, and most are remarkable for the beauty of their colours. Not being generally considered as good for food, it is very seldom that the fishermen send them to the market. The only three sorts I have, up to this time, observed, appear to be new, or, at least, none of the descriptions given by Cuvier, Richardson, or Dr. Gunther can apply to either. The *Parrot Fish*, as those *Labridæ* are commonly called, only appear in the warm months of the year; the first I saw was at the end of September. It is probable that the *Labrus Cyprinaceus* (White, New South Wales, p. 264, pl. 51, fig. 1,) belongs to this genus.

LABRICHTHYS BLEEKERI.

(*Parrot Fish.*)

The teeth are on a double line, particularly at the upper jaw. This would exclude these fish from *Labrichthys*, as Dr. Gunther, in the synopsis of the genera of *Labridæ*, gives to this genus, for a

distinctive character, " teeth in the jaws in a single series ;" but in the characters of the genus, a few pages further on, he says :— " Teeth in the jaws in a single series ; but there is sometimes an interior series of smaller teeth, destined to replace those in function " This only shows how artificial is this division. At the corner of the mouth there are two large posterior canine teeth ; those of the regular line are small behind, and grow gradually stronger as they are placed more forward ; in front, there is, on each side, a strong canine ; behind this line, there is another line of smaller and more blunt teeth. At the lower jaw, the teeth are disposed the same, but those of the inner series do not extend so far backwards. In the young specimens, and perhaps in the females, there are no posterior canine teeth at the angle of the mouth. The head is rough ; the opercles scaly ; on the cheeks, there are two series of scales, and all the surface is covered with irregular lines, which radiate from the eye ; the præoperculum is not serrated.

The height of the body is contained three and one-third times in the total length ; the head four times in the same ; eye four and one-third times in the length of the head. The general profile is oval, the highest place being at about the middle of the fish ; the dorsal scales do not extend on the base of the fin. The lateral line is continuous, following the upper profile till a little before the end of the dorsal, and then descending by an oblique line to the middle, which it follows up to the root of the caudal ; it is formed of a succession of twenty-five long carinated lines, which expand in rather numerous but short arbuscles at their end. The transverse line numbers ten scales, the lateral line running over the third. Dorsal scaleless, formed of nine spines and eleven rays ; caudal rounded, of thirteen long rays ; anal of three spines and ten soft rays ; ventrals of moderate size, pointed ; pectorals large, of thirteen rays.

Entirely of an obscure green on the upper parts, and of a dark blue on the lower ; a broad, black, longitudinal band extends from the posterior edge of the eye to the end of the operculum ; the cheeks are covered with little, irregular white spots ; the throat is purple, spotted with white ; all the scales of the body are bordered with carmine, but there is no trace of spots or bands. The fins are green, the spiny dorsal having red tinges, and the rays

of the soft part are spotted with purple; these spots extend on the membranes; the fin is bordered with red. The caudal has its rays orange, spotted with carmine; the anal has three longitudinal series of large, rounded, carmine spots; the ventrals are pink, and the pectorals yellow; the eye is carmine, with concentric green lines.

I dedicated this sort to my old and celebrated friend, Dr. Bleeker, who not only showed me so much kindness when I was at Batavia, but also has so much helped me for years in my Ichthyological studies in India.

The length of this fish is, on an average, from 10 to 12 inches.

LABRICHTHYS RICHARDSONI.

(Parrot Fish.)

Very much like the former, but a little broader. The teeth are the same, but there is only one canine at the corner of the jaw. The scales, composition of the fins, and lateral line are similar, the latter is formed of twenty-six tubes; the dorsal has nine spines and eleven soft rays; the caudal fourteen rays; the anal three spines and eleven rays; the pectorals thirteen rays.

The general colour is of a light blueish green, with a black spot on the extremity of the operculum, and two broad, transverse bands of the same colour—one extending from the third or fourth spine of the dorsal to the first soft ray of the same; the second, which is often absent, is placed more backwards; the scales have no coloured margin; a few dark spots are usually seen between the fifth, sixth, and seventh spines of the dorsal; the fins are of the colour of the body, the caudal alone having a posterior orange margin; the eye is green, with an inner and outer crimson circle.

My largest specimen measures about 14 inches.

There are three series of scales on the cheeks, and the entire surface is very rough; the dorsal scales do not extend on the base of the fin.

I consider as a variety of this sort a specimen which, with its general form and colour, had three faint transverse, obscure bands, and a longitudinal stripe extending from the angle of the mouth to the first transverse band passing below the eye; the caudal, ventral, and pectoral were yellow, with the fins orange;

the other fins were variegated with purple spots, and edged with crimson; the eye was blue, with an inner and an external crimson circle.

On the dried specimens, appear sorts of longitudinal ridges, such as those that Dr. Richardson has represented in his plate of *L. Laticlavius*.

LABRICHTHYS VESTITA.

The height of the body is contained three and two-third times in the total length; the head is three and three-fourth times in the same; the orbit is seven times in the latter. The anterior part of the head is rather more rounded than in the two first sorts. There is only one long canine tooth on each side, but the dentition seems to vary considerably with age, as in a specimen 12 inches long, there is only one tooth at the corner of the mouth, but there are two, and in some places three, rows of teeth on the upper jaw; on a specimen 17 inches long, there are two teeth at the corner of the mouth, and one line in all the anterior portion of the lower jaw. It is only on the sides that a line of small extra teeth are visible. On the cheeks, there are three or four irregular lines of rounded scales. The lateral line is of the same form as that of the preceding species; it runs over twenty-six scales, and is formed of twenty-three long tubes, expanding posteriorly in very numerous, broad, and intricate arbuscles; the transverse line is formed of fourteen scales. The dorsal is composed of nine spines and eleven rays; it is nearly equal in all its length, the soft part being very little higher than the other. The dorsal scales do not extend over its base; caudal rounded, of thirteen long rays, with another almost as long, and several short ones on each side. Anal with three spines and ten rays; the first spine is about one-third shorter than the second, and this bears about the same proportion to the third; the ventrals have one long and slender spine and five rays, the two first rather prolonged; pectorals of thirteen rays.

The colour is of a reddish lilac, with two broad, transversal bands of a dark brown on the body—one situated just behind the extremity of the pectoral, and the other towards the middle of the soft dorsal. The middle of the head, from the jaws to the operculum, presents a beautiful blue tinge, which extends equally

on the centre of the lower jaw ; the spiny dorsal, the caudal, the pectorals, and ventrals are yellow ; the soft dorsal and the anal are obscure, sometimes black with a blue tinge ; the base of the pectoral is black. These colours are subject to some variation. When dry, the body presents the same feeble longitudinal ridges I have mentioned in another sort.

Seen several specimens, which were found in February ; the longest measured 17 inches. The fishmongers say that this sort is very good for the table.

This may be the *Labrichthys Ephippium* of Gunther ("Ann and Mag. of Nat. History, 1863," p. 116), but it is certainly not the sort described by Cuvier under that name, and which is said to come from New Zealand.

Nota.—The three sorts of *Labrichthys* I here describe can be distinguished in the following way :—

(*a.*) Two series of scales on the cheeks ; no transverse bands.—*Bleekeri.*

(*b.*) More than two ; transverse bands on the body ; ground colour, green.—*Richardsonii.*

——ground colour, reddish.—*Vestita*

I believe that the dentition is subject to great variations with age, and that the presence of one or two teeth at the angle of the mouth is sometimes due to the same cause.

ODAX.

Genus established by Cuvier and Valenciennes on several sorts which have the teeth solved together like the beak of a parrot, but differs from *Scarus*, which has also this character, by the scales of their body being small.

ODAX RICHARDSONII.

Odax richardsonii, *Gunther, Catal. Brit. Mus. Fishes*, vol. iv., p. 241.

Odax semifasciatus, *Richard., Proceed. Zool. Society.*

(*The Stranger.*)

Height of body five and two-third times in total length ; head four times in same ; orbit five and one-quarter times in length

of head; the longitudinal line passing through the centre of the eye, being exactly in the middle of the length of the head; the anterior part of the head protruding in a long snout; the upper lip much longer than the other; the lateral line is not interrupted, and extends to the full length of the body; it is arched upwards in its anterior part, over the pectorals; it extends over about sixty-four scales. The dorsal is formed of thirty rays; the latter eleven branched, the others being very soft, it is often very difficult to distinguish one from the other; this dorsal is equal in all its length; the caudal is rounded, and formed of twelve long rays; the anal has the form of the dorsal, but much shorter, it is formed of twelve rays; the pectoral of fifteen, and is of a rather rounded form. Authors generally attribute a larger number of rays to the dorsal (thirty-two) than I have mentioned, but I have seen many thousand specimens of this fish, and I have always found the same number.

The colours of this *Odax* are most changeable; in fact, it is very difficult to find two specimens exactly alike; it is sometimes of a beautiful green, sometimes blue, at other times red, and very often this ground colour is variegated with beautiful tinges, caused by the edges of the scales being yellow; the body often shows from six to eight transverse obscure bands, that vanish before they reach the lower part, which is generally white; there are often irregular longitudinal bands, sometimes yellow, sometimes blue, on the sides of the head and on the snout; but often, also, the upper part of the head is of a dark green, with the sides silvery white, the latter showing irregular yellow spots. The fins are often hyaline, and without spots, but often also the dorsal and anal have numerous yellow or red irregular bands and spots; in most specimens, black spots can be seen on the membranes of four or five of the posterior fins, commencing at the fifteenth or nineteenth; the eye is of a beautiful yellow, sometimes bordered with green, sometimes with light blue.

The adult specimens measure from twelve to sixteen inches. This fish is very common all the year round in the Melbourne Market, and is moderately esteemed for food.

The *Odax Pullus*, Bl. &. Sch. (*Scarus*), is probably founded on one of the varieties of this sort. It was found in New Zea-

land by Forster, and in Western Port by Messrs. Quoy and Gaimard. Cuvier and Valenciennes (vol. xiv., p. 305,) state that it has thirty-four rays to the dorsal, but as all the thousands of *Strangers* that are brought from Western Port belong to the same sort, I cannot but think there is some mistake in these numbers.

I had taken this sort for the *Odax Semifasciatus* (Cuv. & Val., v. xiv., p. 299), and I see that Richardson has been of the same opinion; but Dr. Gunther, finding that it has its præoperculum entire, very properly distinguishes the Australian species from it; he also thinks that the *Pullus* of Cuvier and Valenciennes is not the one of Bloch, which was brought by Forster from New Zealand.

ODAX OBSCURUS.

Height of body a little over four and one-half times in the total length; length of head three and three-quarter times in same; eye four and three-quarter times in length of head.

The head is not protruded in so long a snout as in the first species, and a longitudinal line passing through the centre of the eye would be much nearer to the extremity of the muzzle than to that of the operculum; the profile of the head forms a rather long oval; the upper lip is rather longer than the other; the præoperculum is very finely denticulated; the lateral line extends to the base of the caudal, and is arched over the pectorals; it runs over about forty-five scales, these being much larger than those of *Richardsonii.*

Dorsal of twenty-eight rays; its height is equal in all its length; caudal rounded, of thirteen rays; anal of fifteen; pectorals rounded, of fourteen rays.

The general colour is almost black with a purplish tinge; the upper part of the head is of a lighter brown; on its sides are numerous, narrow, flexuous red lines running longitudinally; eye of a beautiful red, with a broad exteral blue circle; dorsal and anal of a light blue colour, covered with oblique scarlet lines; it has also a broad black border; the other fins black.

Only seen once at the Melbourne Market, in the month of December; but it is probable that the following only constitutes a variety of the same sort:—

Body of a grey colour, with a few irregular green spots on the back; upper part of the head green, with the sides blue; on these there are numerous longitudinal undulating narrow lines; the posterior margin of the scales, on the sides of the body, are pink, as are also the throat and the fins; the dorsal, caudal, anal, and ventrals have a rather broad black margin; the three first are covered with irregular narrow spots, forming oblique lines on the dorsal and anal, and transverse ones on the caudal.

Seen several times in the Melbourne Market. In size never more than from 5 to 6 inches long.

Nota.—I should have taken this for *Balteatus*, if any of the specimens I have seen had shown any trace of the dark band from which the name of the sort has been derived.

OLISTHOPS.

Dr. Richardson formed this genus in the "Annals and Magazine of Natural History for 1850," and gave a figure of the sort he knew in the "Proceedings of the Zoological Society" of the same year. Dr. Gunther changed the name to *Olistherops;* but I see no sort of use, nor even of right, in these so-called rectifications. The latter author characterises the genus thus:—"Head entirely naked; scales of moderate size; lateral line continuous; snout of moderate extent; dorsal spines numerous, flexible." All this agrees well with the fish I here describe; but the sort known is represented as having a blueish streak along the upper and lower margins of the caudal, and along the upper margin of the pectoral, and may be different from mine.

OLISTHOPS CYANOMELAS.

Olisthops cyanomelas, *Richard., Ann. and Mag. Nat. Hist.*, 1851, p. 291.

Body elongate; front part of the head rounded. Height of body five times in the total length; head five and a-half times in the same; orbit five times in the length of the head. Teeth like those of *Scarus*, soldered together, and forming a sort of parrot beak, on the edge of which the teeth are visible. Lateral line extending on the root of the caudal; it is rather flexuous, and considerably rounded over the pectoral, running over about sixty scales; these are of moderate size, and are covered with concentric lines. On the transverse line I find nineteen scales, on the

seventh of which the lateral line passes. The anterior part of the latter forms on each scale a little ridge, which terminates posteriorly in a short, oblong line, recurved upwards. This is seen on the twelve or fourteen first scales only. The dorsal is high in front, depressed in the middle, with the soft portion high again; it is composed of fifteen or sixteen spines and of eleven soft rays. The caudal is truncated, with its external angles prolongated; it is formed of twelve long rays and of several short ones on each side; the anal has one spine and from nine to twelve rays; the ventrals are rather small; the pectorals large, of thirteen rays.

The colours are subject to great variation. Some specimens are of a dark brilliant brown, with a rounded spot of a beautiful light blue on each side; the lower parts are variegated with orange and blue; the head is dark brown on its upper parts, of light blue on the sides, with longitudinal, narrow, and irregular orange lines; these have a black border. Fins orange, with numerous light blue spots on the posterior part of the spiny portion of the dorsal; on the soft portion of the same, and on all the other fins, are very numerous dark blue spots. On the upper part of the back, adjoining the head, is a broad, transverse, yellow spot; eye yellow.

This description applies to three specimens I obtained in the month of June. One of them was shorter, and its upper profile was much more convex; it was said by the fisherman to be a male. On the 10th of October, 1871, a large number of specimens made their appearance on the Melbourne Market; their form was the same, but their colours generally very different. Some were entirely black, with a blue streak in front of the eye; this was green, with an internal red circle; the external rays of the caudal were strongly prolongated. Others were of a chocolate colour; others of a livid yellow, and others, again, of a dark green.

I at first considered these as belonging to different sorts, and the difference in the numbers of the dorsal spines confirmed me in that opinion; but, on examining numerous specimens, I found insensible passages from one to the other, and I believe they all belong to one very variable sort. On the dried specimens, a short sulcate is visible on each scale, and their union gives the appearance of longitudinal lines, which I did not observe on the fresh specimens.

The flesh of this sort is green, and it does not appear to be used as food, probably for that reason. It is rarely seen on the market, and does not appear to have any usual name. My largest specimen measures over 15 inches.

It is probable that this is the *Toobitooit* mentioned by Richardson, from a drawing—"*Erebus and Terror*, Fishes,' p. 134.

GERRIDÆ.

"Body compressed, elevated, or oblong, covered with sparoid scales. Lateral line continuous. Dorsal fin with spinous and soft portions equally developed, and with a scaly sheath along the base, which is separated by a groove from the other scales. Anal with three (two) spines, and with the soft portion similar to the soft dorsal. Ventral fins thoracic, with one spine and five soft rays. Teeth small, palate toothless. The lower pharyngeal bones are firmly united by a suture. Branchiostegals, six; gills, four; pseudobranchiæ present; glandular air bladder present. Stomach without cæcal sac; pyloric appendages, rudimentary. Oviparous.

"Tropical seas."

Dr. Gunther, in the first volume of his "Catalogue," places *Gerres* in his *Pristipomatidæ*, where it seems to come very naturally; but, in the fourth volume of the same work, he formed for it a family (*Gerridæ*), that he places near *Labridæ*, and immediately after the small family of *Embiotocidæ* of Agassiz.

GERRES.

Formed by Cuvier, and composed of rather numerous species, generally inhabiting the warm and tropical seas, one only having

been found on the coast of North America, as far north as New York.

The great protractility of the mouth made the illustrious Cuvier place it in a family he had called *Menidæ;* but in my paper on the fishes of the Cape of Good Hope, written in 1861, I protested against this character being considered as of first importance, as it is to be found in sorts of almost all families.

The species I describe here partakes of the characters of *Ditrema*, by the large number of the anal rays, which in *Gerres* are not generally more than eight or nine.

GERRES MELBOURNENSIS.

The height of the body is contained two and a-half times in the total length, without the caudal; the eye is very large, and only contained two and one-third times in the length of the head, when the mouth is not extended; when it is, the distance from the extremity of the snout to the anterior margin of the eye is a little less than the diameter of the orbit. The teeth are numerous and villiform; there are none on the vomer or palatine. The profile is very convex over the eye and the snout. When the mouth is not extended, it is rather bent downwards. The head is contained, in this state, four times in the total length, including the caudal; the operculum is entire, as is also the præoperculum, and the præorbital. The scales are large, being only thirty-seven or thirty-eight on the lateral line; this line is marked by a succession of short, elevated, oblique lines, and is strongly curved near the head. The spiny portion of the dorsal is much shorter than the soft one; it is formed of nine rather feeble spines; the first one is shorter than the following, which are about equal, the posterior ones being something longer than the others. The rays number sixteen; the first are about of the same length as the last spines, but they become rather longer as they go backwards. The caudal is forked; it is formed of eighteen long rays and of several shorter ones on each side; anal with three spines, rather stronger than those of the dorsal; the first is the shortest, and the third the longest; the rays number seventeen, the first of which is longer than the third spine, and the others decrease slightly towards the tail. The ventrals are inserted a little behind the pectorals; they are formed of a long slender spine and of five

rays; the pectorals are arched; they are rather shorter than the head, and formed of fifteen rays, of which the first is short, and the third the longest of all, and extends further than the spines of the anal. The dorsal and anal are received in a low, scaly sheath; the longest spines of the dorsal are equal to the diameter of the eye; this same dimension is contained one and a-quarter times in the caudal at its centre, and twice on its sides.

General colour silvery; the upper parts are blue, and the sides have a copper tinge; there are faint longitudinal lines, due to the centre of the scales being rather obscure. The spinous dorsal is purple, and the soft part rather yellow; the caudal is of the latter colour; anal, pectorals, and ventrals, pink eye yellow, the pupil rather angular.

Seen several specimens in the month of July.

Order III.—ANACANTHINI.

"Vertical and ventral fins (except in gadopsis) without spinous rays. The ventral fins, if present, are jugular or thoracic. Air-bladder, if present, without pneumatic duct.

GADOPSIDÆ.

"A small portion of the dorsal and anal fins is formed into true spines. Gadopsis Marmoratus.

"Fresh waters of Australia and Tasmania.

GADOPSIS.

This very singular fish has been separated from all others by Dr. Gunther as a distinct family.

The only sort yet described is the following:—

GADOPSIS MARMORATUS.

Gadopsis marmoratus, *Richard., Ereb. and Ter.*, p. 122, pl. 59.

(The Black Fish.)

The *Black Fish*, well known to the colonists, is found in almost all the streams of South-Eastern Australia; but it is not quite certain that it belongs to the sort described by Richardson, and which was brought from Tasmania; at least the figure given by this author is much shorter than the specimens found in the Yarra River, and these have one dorsal spine more. D. 12—26. C. 16 (with six small rays on each side). A. 3—18. P. 17. V. 1 (bifid).

The height is six and a-half times in the total length; the head four and a-half times in the same; and the orbit five and a-half times in the length of the head. The teeth are very numerous, cardiform, and arched backwards. On the very old specimens, there are a few larger ones in front, having rather the appearance of canines.

It is of a dark olive colour, with the lower parts of a dirty yellow; the back is covered with obscure blotches, which give the fish a black appearance; the fins are almost black.

The largest specimens I have seen were 16½ inches long. I am not certain that the *Black Fish* of all the streams of the Colony belong to the same sort; it is considered good food.

Nota.—Mr. Merle, of Daylesford, has kindly sent me some specimens from the Loddon River. They are of a light green, with very few obscure blotches on the back; the belly is white, and the sides of the head rosy. There are a few irregular obscure spots on the dorsal; the eye is rather green. The dorsal has nine spines and twenty-seven rays, and the anal three spines and eighteen rays. The height of the body is contained five and two-third times in the total length. The largest of these specimens is a little over 6 inches long. The ventrals are evidently formed of two rays, united in a great part of their length; but the fresh specimens of the common *Black Fish* of the Yarra have the same appearance.

GADIDÆ.

"Body more or less elongate, covered with small smooth scales. One, two, or three dorsal fins, occupying nearly the whole of the back; rays of the posterior dorsal well developed; one or two anal fins; caudal free from dorsal to anal, or if they are united, the dorsal with a separate anterior portion. Ventrals jugular, composed of several rays, or if they are reduced to a filament, the dorsal is divided into two. Gill opening wide; the gill-membranes generally not attached to the isthmus. Pseudobranchiæ none, glandular, rudimentary; an air-bladder and pyloric appendages generally present.

"Mostly inhabitants of the sea. Arctic and temperate regions."

PSEUDOPHYCIS.

The genus *Pseudophycis* was formed by Dr. Gunther on the *Lota Breviuscula* of Richardson ("*Erebus* and *Terror*"). This sort was found on the coast of New Zealand, and is very nearly allied to the fish I describe here. In fact, the only differences consist in the body, which is much shorter, and in the form of the ventrals, which, in Richardson's plate, are represented by a long bifid filament. This form of the ventrals does not admit of the fish I here describe being placed with it, and I should have to class it with *Lotella*, a genus established by Kaup, and characterised, in Dr. Gunther's Catalogue, as follows:—"Body of moderate length, covered with small scales; a separate caudal; two dorsal fins and one anal; ventral fins with a flat base, and composed of several rays; teeth in the upper jaw in a band, with an outer series of larger ones; vomerine or palatine teeth, none;

chin with a barbel." All this agrees well with my sort, except the teeth. It would appear to come very near to Forster's *Gadus Bacchus* (*Rubiginosus* Solander), but the composition of the fins is very different.

PSEUDOPHYCIS BARBATUS.

Pseudophycis barbatus, *Gunther, Ann. and Mag. of Nat. Hist.*, 1863, p. 116.

(*Rock Cod.*)

The height of the body is about three and a-half times in the total length, and the head four and two-third in the same; the orbit is very oval, and in its largest diameter is contained less than four times in the length of the head; this diameter is equal in length to the snout. The upper profile is regular, but the belly is rather inflated; the lower jaw is slightly longer than the other. The teeth are very numerous, in three or four rather irregular rows; they are all of the same form—slender, arched, acute, and all of about the same size; they are similar on both jaws; the chin bears a very short and slender barbel. The præoperculum is entire, and rounded; the operculum is terminated by a strong angle, and its posterior edge bears traces of radiated lines. The body is rather compressed, tapers posteriorly, is covered with small scales, which fall very easily; they number about one hundred and thirty on the longitudinal line. I find it very difficult, on my dry specimens, to count correctly those of the transverse lines, but I find thirteen over the lateral line, and more than twice as many below. The two dorsals are equal in height; their membranes are covered with scales on considerably more than one-half of their height; the first is formed of ten rays, the last of which is united with the second dorsal by a very low membrane; this latter is composed of fifty-one rays, and is rounded posteriorly; the caudal is also of this form, and composed of twenty-seven rays; the anal is similar to the second dorsal, but somewhat shorter; it has fifty-five or fifty-six rays. The pectorals are contained about twice in the length of the head, and are inserted a little behind the beginning of the first dorsal; they have twenty-two rays. The ventrals are placed before and below the end of the operculum; they are narrow, and formed of five rays, intimately joined, the external

one being prolongated in a filament; taken from the extremity of this latter, the fin is about one-half of the length of the head. The space between the extremity of the lower jaw and the anus is not quite as long as the anal fin.

The upper parts are of a light brown; the head rather red; the lower parts of a whitish flesh colour, sometimes white; the fins are light brown, with a black terminal edge; the pectorals are sometimes almost white and transparent, and sometimes rather dark.

My longest specimens are about 15 inches, and I do not think it grows much larger. It is esteemed for food, and is very common on the Melbourne Market, particularly during the cold months of the year.

Dr. Gunther describes in the same work a *Lotella Collarias* from Victoria, that I have not yet met with.

OPHIDIIDÆ.

"Body more or less elongate, naked or scaly. Vertical fins generally united into one; no separate anterior dorsal or anal; dorsal occupying the greater portion of the back. Ventral fins rudimentary (reduced to a filament) or absent, jugular (except in Brotulophis). Gill-openings wide; the gill-membranes not attached to the isthmus. Pyloric appendages none, or in small number.

"Inhabitants of the seas of nearly all regions."

GENYPTERUS.

Genus established by Dr. Andrew Smith, in his "Illustrations of the Zoology of South Africa," under the name of *Xiphiurus*, which, in my notice on the fishes of the Cape of Good Hope, I adopted; but Dr. Gunther, in the eleventh volume of his Catalogue, finding it was pre-occupied, has very properly changed the name to the appellation we now adopt.

The same author gives the genus the following characters:— "Body elongate, compressed, and covered with minute scales; eye of moderate size; vertical fins, continuous; ventral fins replaced by a pair of bifid filaments (barbels) inserted below the glosshyal; teeth in the jaws, on the vomer and on the palatine bones; the outer series in the jaws, and the single series on the palates, contain strong teeth; lower jaw received within the upper; vent situated at some distance behind the pectoral; seven or eight branchiostegals; gill-opening wide; gills, four, a slit behind the fourth; pseudobranchiæ and air-bladder present; pyloric appendages in small number (six).

GENYPTERUS AUSTRALIS.

(*The Rock Line.*)

Height eight times in the total length, and one and a-half times in that of the body; eye seven and a-half times in the head; the barbels in the young specimens about one-third the length of the head, but in the old specimens one-half this length; in the young the outer filament is much shorter than the inner half; but in the large ones they are about equal.

The teeth of the jaws are on two series; the outer ones are large, thick, conical, and wide apart one from the other; the inner ones smaller, of the same form, but placed nearer one to the other, and sometimes two by two; in the young specimens the teeth are more slender; the inner ones in numerous series and arched. The lateral line is well marked on the full length of the body, except on its posterior eighth part; it is formed of several lines placed near one another, and having a notch from distance to distance; the number of these notches is about forty-seven; at some of these there is a short oblong appendice. The scales are small; the transversal lines numbering nearly three hundred; the pectorals are all contained about two and a-half times in the length of the head.

The general colour is of a light lilac; the belly is white; the body is covered with large marbled blotches, irregular in form, but generally rounded; on the back they are confluent, and they extend over the head. The eye is silvery. The dorsal and anal are dark and marbled like the body; the extreme edge of the dorsal is white, and the one of the anal flesh colour; pectorals spotted

The anus is situated a little nearer to the extremity of the mouth than to the end of the tail.

Very common in the Melbourne Market, particularly in the cold months of the year. Its flesh is considered very delicate. I think it must have been described, but I am unable to identify it with any known sort.

The figure of *Ophidium Maculatum*, given by Tschudi, *Faun. Peruv.*, p. 25, pl. 4, is so very similar to this fish, that I hesitate to separate the two; but he represents the head as being without spots. The ventrals have been forgotten on the figure.

The *Ophidium Blacodes* that Forster found on the coast of New Zealand is also very nearly allied to it, and it is possible that all these fishes may belong to the same sort; but Dr. Gunther says that the lateral line is scarcely visible, and disappears entirely in the middle of the body, which is not the case with the Melbourne fish.

The usual size is about 20 inches; but I have a specimen which measures 27.

MACRURIDÆ.

"Body terminating in a long, compressed, tapering tail, covered with spiny keeled or striated scales. One short anterior dorsal, the second very long, continued to the end of the tail, and composed of very feeble rays; anal of an extent similar to that of the second dorsal; no caudal. Ventral fins thoracic or jugular, composed of several rays. Pseudobranchiæ none; six or seven branchiostegals. Air-bladder present. Pyloric appendages numerous.

"Temperate parts of North Atlantic, Mediterranean, Japanese, and Australian Seas."

I have not observed any in Victoria.

PLEURONECTIDÆ.

"Body strongly compressed, flat, with one of the two sides, which is always turned upwards, coloured, whilst the other is colourless, and only sometimes spotted. Both eyes are placed on the coloured side; and although the bones are present on both sides of the skull, they are not equally developed or symmetrical. Dorsal and anal fins exceedingly long, without divisions. Gills, four; pseudobranchiæ well developed. Air-bladder, none.

"Carnivorous fishes, living on the sandy bottom of the coasts of all the regions; many ascend rivers."

RHOMBOSOLEA.

Genus established by Dr. Gunther, with the following characteristics:—Eyes on the right side, the lower in advance of the upper; the mouth unsymmetrical, narrower on the right side than on the left; the length of the left maxillary being less than one-third of that of the head; teeth on the blind side only, where they are villiform, forming bands; no vomerine or palatine teeth; most of the dorsal and anal rays branched; the dorsal fin commences on the foremost part of the snout; only one ventral, which is continuous with the anal; scales very small cycloid; lateral line straight; gill-openings narrow, the gill-membranes being broadly united below the throat; gill-rakers short and conical.

The following Melbourne fish enters evidently in this genus, but cannot be placed in any of the three species described by Dr. Gunther. In the sort I describe here, the dorsal extends to the end of the snout, but the number of its rays do not agree with any of the species mentioned by that author.

RHOMBOSOLEA BASSENSIS.

(*The Melbourne Sole.*)

The height of the body is two and a-half times in the total length; the head is nearly five times in the same; the space between the eyes is covered with scales, and is one-half the longitudinal diameter of the eye; the lower eye is considerably in advance of the upper; snout contained three and two-third times in the total length of the head; the eye five times in the same. The dorsal fin begins at the foremost extremity of the snout, and has seventy-five rays, the first twenty-five having a short prolongated filament; caudal quite free, formed of eighteen rays, thirteen of which only attain its extremity; anal of fifty-one rays; ventrals with seven rays, having short filamentary prolongations; the pectorals are one-half the length of the head, and are formed of twelve rays; the external fourth part of the rays being free of the membranes.

The operculum has a rather strong angle above the root of the pectorals; the lateral line is straight, and runs over about ninety lines of scales. The teeth on the right side are very few, irregular, and tuberculous, but on the blind side they are very numerous, on four or five very irregular lines; they are conical and sharp, and some are slightly curved; on the lower jaw the teeth are similar, but on four lines. The scales of the body are puncto-striated, and strongly ciliated, which makes the fish feel rough to the touch; the fin rays are entirely covered with scales.

The general colour is of a dark brown, marbled with black blotches, the sides of which are well shaded with the general colour; in the larger specimens this is sometimes entirely black.

The largest specimens attain one foot long.

It is found all the year, but more commonly during the cold months. It sometimes goes up the Yarra to Melbourne.

Nota.—Professor M'Coy, in the "Intercolonial Exhibition Reports, 1866-67," says, that a true *Solea*, nearly allied to *S. Margaritifera*, is found in Hobson's Bay, and it is probable that he means this sort; but the distinctive character of *Solea* is

that the upper eye is in advance of the lower one, and the contrary is here the case.

PLEURONECTES.

It is only with considerable doubt that I place in this genus the following sort, as the dorsal begins before the line of the eyes; but in Dr. Gunther's division of the *Pleuronectidæ*, it would be included in his second division:—"Cleft of the mouth narrow, with the dentition much more developed on the blind side than on the coloured." The lower eye is considerably in advance of the upper one; and the dorsal does not begin on the foremost part of the snout.

PLEURONECTES ? VICTORIÆ.

(*The Melbourne Flounder*).

The height of the body is twice and one-third in the total length, or less than twice up to the base of the caudal; head a little over four times in the total length; eye five times in the length of head; the space between the eyes narrow and scaleless; the teeth are absent on the coloured side, but are rather long, slender, and numerous, particularly in young individuals; on the other side they appear in part worn out in the old ones; the snout, up to the edge of the lower eye, is as long as the diameter of the latter; the same diameter of the upper eye, is contained one and one-fourth times in the snout; the operculum has an angle over the root of the pectorals; the lateral line is straight, and runs over about eighty-five scales; it is prolongated on the head, and emits a branch behind the operculum, which runs obliquely towards the dorsal, that it meets between the fifth and sixth dorsal ray; the scales are small and rounded; in the old specimens they are sensibly concave, particularly on the head and on the upper part of the body. The dorsal is much higher towards the middle of the body than in its other parts, it has fifty-six or fifty-seven rays, which are always longer than the membranes, and gives the upper edge an appearance of being fringed; the anterior ones are more prolongated, and the first of all is free, bifid, and only connected with the others by a very low mem-

brane ; the caudal is large, rather rounded, and formed of nineteen rays, of which thirteen only are long ones ; ventrals formed of six rays, which are united to the anal by a membrane without rays ; the anal is formed like the dorsal, and has forty-one or forty-two rays ; the pectorals rather longer than the distance from the end of the snout to the posterior margin of the eye, and formed of eleven rays.

This fish is common on the Melbourne Market, but rarely attains a foot in length. It is of an olive green, with large marbled blotches of a darker and brownish colour ; the lower side is white, with its pectorals rather pink ; the eye is black, with an orange circle.

It is esteemed for the table.

Nota.—Professor M'Coy considers this fish, "Intercolonial Exhibition, 1866-67," as being the *Rhombosolea Flesoides* of Dr. Gunther ; but the description of this specie, "Ann. and Mag. of Natural History," 1863, p. 116, does not agree with it ; the numbers of the rays are very different ; the bifurcation of the lateral line is not mentioned ; the dorsal also seems to begin too far behind to allow it to be placed with *Rhombosolea.*

Order IV.—PHYSOSTOMI.

"All the fin-rays articulated ; only the first of the dorsal and pectoral fins is sometimes more or less ossified. The ventral fins, if present, are abdominal, without spine. Air-bladder, if present, with a pneumatic duct.

SILURIDÆ.

"Skin naked, or with osseous scutes, but without scales. Barbels always present ; maxillary bone rudimentary, almost always forming the base of a maxillary barbel. Margin of the upper jaw formed

by the inter-maxillaries only. Sub-operculum absent. Air-bladder generally present, communicating with the organ of hearing by means of the auditory ossicles. Adipose fin present or absent.

"Inhabitants of the fresh waters of all the temperate and tropical regions, some entering the salt water, but keeping near the coast."

COPIDOGLANIS.

This is the only sort of *Siluridæ* I have yet seen in Australia, but several others are described from the Northern Territory, and from New South Wales.

COPIDOGLANIS TANDANUS.

Plotosus tandanus, *Mitchell, Exped.*, v. i., p. 95, pl. 6, fig. 2.

Copidoglanis tandanus, *Gunther, Cat.*, v. p. 26.

(*The Murray Catfish.*)

The colours of this curious fish are subject to the greatest changes. Sometimes it is of an olive yellow, lighter on the lower parts. On the back are feeble marmorated spots, steel colour; head of a fine carmine colour, as also the barbels and pectorals; the first dorsal is of a dark olive at its base, and red in the other parts; the second dorsal is also of an obscure olive, bordered with red; the caudal and anal are dark green. In other specimens, the back is entirely of a brownish black, which extends on the sides, and the red tinges sometimes almost disappear; in others again, the general colour is almost white, and the head is often yellow. It is almost impossible to find two specimens entirely alike.

This sort appears to be common in the Murray and in the rivers of Riverina; it is brought to Melbourne, at times, principally in winter, by the Echuca Railway. It is considered good food, and attains two feet in length. The fishermen of the Murray distinguish three sorts—the white, the black, and the blue, but I think they only constitute varieties of colour.

HAPLOCHITONIDÆ.

"Body naked or scaly. Margin of the upper jaw formed by the intermaxillary; opercular apparatus complete. Barbels, none. Gill opening wide; pseudobranchiæ well developed. Air-bladder simple. Adipose fin present. Ovaries laminated; the eggs fall into the cavity of the abdomen, there being no oviduct. Pyloric appendages, none.

"Fresh water fish, from the temperate parts of South America and South Australia, representing the Salmonoids of the Northern Hemisphere."

PROTOTROCTES.

Formed by Dr. Gunther on a very remarkable fish found in several rivers of Victoria and of North Tasmania.

PROTOTROCTES MARÆNA.

Prototroctes maræna, *Gunther*, *Catal.*, vol. v., p. 382.

(*Yarra Herring.*)

Having not yet seen this sort living, or in a fresh state, I only mention it here; it exhales a very strong and particular smell. It used to be very common in the Yarra, but since the introduction into that river of the *Murray Cod*, it seems to have been almost destroyed by it. No specimens, are to my knowledge, now found near Melbourne, and it has become very scarce even in the upper parts of the river.

SCOPELIDÆ.

"Body naked or scaly. Margin of the upper jaw formed by the intermaxillary only; opercular apparatus sometimes incompletely developed. Barbels none. Gill-opening very wide; pseudobranchiæ

well developed. Air-bladder, none; adipose fin present. The eggs are enclosed in the sacs of the ovarium, and excluded by oviducts. Pyloric appendages few in number or absent. Intestinal tract very short."

AULOPUS.

Formed by Cuvier, in his "Règne Animal," on a curious Mediterranean fish, which, on account of its adipose dorsal fin, had been placed with *Salmo* by Bloch and others. Its characters give it much affinity with fishes of the most remote families. Dr. Gunther has placed it with his *Scopelidæ*. M. Valenciennes, Cuvier's learned colloborateur, having received from Teneriff the male and female of this sort, thought that they belonged to two different species; but since then, it has been ascertained that the first mentioned sex is always adorned, in this genus, with dorsal filaments, which do not exist in the female. In the last volume that has ever been published of his great work on fishes, the French author describes a second sort from Australia, but it had been previously published by Dr. Richardson.

AULOPUS PURPURISSATUS.

Aulopus purpurissatus, *Richard., Icon. Pisc.*, p. 6, pl. 2, fig. 3.
——— milesii, *Cuv. & Val., Hist. des Pois.*, v. xxii., p. 519, fig. 650.

This sort is so very scarce at Melbourne as not to have received any particular name. At Sydney, it appears to be much more common, and is known as *Sergeant Baker*.

D. 1/19. A. 13. V. 9. P. 11. C. 20 long rays.

Height of body five and two-third times in the total length; the head is a little more than four times in the same; the orbit is contained six times in the length of the head. The lower jaw is longer than the other; the teeth very numerous, on, at least two lines, on the jaws, and other larger ones are on the palatine and the vomer. The ventral is very singularly conformed; its

four first rays are thick and bifid, but not branched; the first is even simple. The dorsal is large; its spine is much shorter than the rays, and in the male the first of these prolongates in a very long filament; this is bifid, the internal limb being much shorter than the outer one; the adipose is covered with scales.

In a female specimen, I find a rather long filamentary appendice inserted on the posterior edge of the maxillary, over the angle. Having seen no other specimen of that sex, I do not know if this is accidental.

The colours of this fish are really magnificent. The upper parts are of a greyish blue, with fine red, orange, and yellow tinges on the sides of the head. On the back, extend rather numerous transverse blotches of a fine scarlet carmine; these alternate with others which start from the lateral line, and extend towards the belly without attaining it. The dorsal is yellow, marbled with crimson; the adipose are purple at the base, yellow in their middle, and bordered with red on their external edge. The caudal is yellow, spotted with the most beautiful crimson; the anal is white, with orange bands; pectorals yellow, with transversal red spots; ventrals yellow, with purple spots, and the extremity of the rays are pink.

This description is taken from a female specimen caught in the month of May, 1871. In the same month, and a few days after, a male fish was brought to the market. The colours were less brilliant and darker; the upper parts were almost entirely purple; the caudal is of the last colour, with some marbled spots grey; the lateral sides are of a rosy red; the long filament of the dorsal, and also the straight rays and their membranes, are of the same colour; the remainder of the dorsal is white, with purple rounded blotches in considerable number; the adipose is purple.

These are the only two specimens I have seen; one was called by a fishmonger *Rock Gurnet*, and the other *Flying Gurnet*. The length of the longest is about 19½ inches, and the other about an inch shorter.

Nota—Since this was written I have seen another specimen with the long dorsal filament; its colours were not brilliant.

SALMONIDÆ.

"Body covered with scales, head naked; barbels none. Margin of the upper jaw formed by the intermaxillaries laterally. Belly rounded. A small adipose fin behind the dorsal. Pyloric appendages generally numerous, rarely absent. Air-bladder large, simple; pseudobranchiæ present. The ova falls into the cavity of the abdomen before exclusion.

"Fresh waters of the temperate and Arctic regions of the Northern Hemisphere; many species periodically descending to the sea. One genus from New Zealand; two genera pelagic."

Only represented in the Australian seas by a sort of *Retropinna*, found in New Zealand, and, perhaps, a second in New South Wales (Krefft). This almost total absence of a family whose sorts abound in the fresh waters of South America, forms one of the most curious features of Australian ichthyology.

GALAXIDÆ.

"Body naked; barbels none. Margin of the upper jaw chiefly formed by the intermaxillaries, which are short and continued by a thick lip, behind which are the maxillaries. Belly rounded. Adipose fin none; dorsal opposite to anal. Pyloric appendages in small number. Air-bladder large, simple; pseudobranchiæ none. The ova fall into the cavity of the abdomen before exclusion.

"Fresh waters of the temperate zone of the Southern Hemisphere."

GALAXIAS.

Genus formed by Cuvier in his "Règne animal," on a sort brought from Tasmania by Péron and Lesueur. Since then, several other Australian species have been described by Richardson. This form inhabits also the extreme southern portion of the American Continent; and Dr. Gunther unites several of these American sorts with those of Australia, the propriety of which is very unlikely with fresh-water fishes.

It is to be remarked that Cuvier and Valenciennes, in describing their *Galaxias Fasciatus*, state that it is from New Zealand; but that the specimens were given to Messrs. Lesson and Garnot at Conception in Chili, by whalers, who had probably salted them for their food, and this may have led to some confusion.

It is said that some of the American sorts live amongst the seaweeds; the Australian fish inhabit the rivers, and those of the Yarra only extend their *habitat* a little below Melbourne, to the place where the water becomes brackish.

GALAXIAS OCELLATUS.

Galaxias ocellatus, *M'Coy, Inter. Exhibit. Essays*, 1866-67, page 14.

(*Yarra Trout.*)

This is very nearly allied to the Tasmanian sort *Truttaceus*, Cuvier. The body is short and thick for the genus; the head is convex over the eyes; the height of the body is contained five and one-third times in the total length; the head five and two-third times in the same. The dorsal has eleven rays, of which the first one is very short, the next two longer, but much shorter than the others; the caudal is entire and rounded, of fifteen long rays, with two or three shorter on each side; the anal is large, of fifteen rays, of which the first is very short; the ventrals are nearer to the anal than to the pectorals; they are formed of seven rays, and the pectorals of fourteen.

The body is of a light olive green, with the belly grey; it is covered with iridiated, round, oscellated black spots; the sides of the operculum have a golden tinge; the fins are of the general colour of the body; the pectorals are white; the eye is green, speckled with black.

River Yarra. Length, 6 inches.

GALAXIAS VERSICOLOR.

Body oval; head attenuated, and rather pointed. Height four and two-third times in the total length; head five and eight-tenths in the same; eye four and one-third times in the length of the head. The lower jaw is a little longer than the other; cleft of the mouth rather small; the maxillary just attaining the vertical from the anterior margin of the eye. The fins are rather large; the dorsal and anal begin opposite one another; the first has nine rays, and the second twelve; the caudal is rather emarginated, with sixteen long rays; the pectoral is equal in length o the distance from the posterior margin of the eye to the end of the operculum; it is formed of thirteen rays; the ventrals are placed at an equal distance from the pectorals and the anal. The teeth are small on the upper jaw, but much larger, straight, pointed and rather distant one from the other on the lower; those of the tongue are large, straight, and pointed.

The body is of a fine green; the lower part of the head is grey, and the one of the body of an orange yellow; the head and body are covered with very minute blue points. The fins are grey, with the rays white; the ventrals are also white; the fluxes form on the middle of the body traces of transverse obscure arched lines; eye of the colour of gold.

Seen only one specimen, in a marsh near St. Kilda. Length, 5½ inches.

GALAXIAS ATTENUATUS.

Galaxias attenuatus, *Jenyns, Zool. Beagle, Fishes*, p. 121 pl. 22, fig. 5.

——————— *Cuv. & Val.*, vol. xviii., p. 348.

Height of the body seven and six-eighth times in the total length; length of head, six and a-half times in same; eye five times in the length of the head. Body very elongate; rather cylindrical; jaws equal in length; cleft of the mouth rather small, not attaining the vertical from the front of the eye. The lateral line is well marked and straight. From the beginning of the dorsal to the vertical of the centre of the eye, there is three times the distance to the beginning of the caudal; the dorsal has

eleven rays ; the caudal is emarginate, of sixteen rays ; the anal is a little behind the dorsal, and has fourteen rays ; the ventrals are inserted a little nearer to the anal than to the pectorals ; they are rather large, and formed of seven rays ; the pectorals are rather shorter than the ventrals, but longer than the distance from the posterior margin of the eye to the extremity of the operculum. The lower teeth are a little longer than the upper ; on the tongue there are are three or four large teeth in front, and a line on each side further backwards.

Of a light green colour, with the belly white ; the head is purple ; all along the body are numerous, minute, black points, disposed in transverse clusters. The fins are white ; sometimes there is a transverse green blotch on the middle of the dorsal ; base of the anal of the same colour ; caudal, is green ; the eye, silvery.

Very common in the lower Yarra ; it attains 7 and 8 inches in length.

The specimens preserved in liquor, take a general brown appearance.

Nota.—I have given here the number of fin rays that I have usually found ; but they seem to be subject to great variation, as in some specimens absolutely similar I find—D. 10. A. 15. In one, the number of the dorsal rays is much less still, (7) ; but I am not certain that it is entire.

GALAXIAS CYLINDRICUS.

Very nearly allied to *Attenuatus*, but still longer. The height of the body is contained ten and a-half times in the total length ; the head is seven and a-quarter times in the same ; the eye is four and a-half times in the length of the head. The lower jaw is rather longer than the other. The body is long and cylindrical. The dorsal is formed of ten rays —the first very short ; the anal of from twelve to fourteen, the first of which is very short ; the caudal is emarginated, of eighteen or nineteen long rays ; the ventrals of seven rays ; they are placed at an equal distance from the end of the mandibula to the base of the anal. Six very large hooked teeth on the front part of the tongue, and others, on each side, backwards.

The colours are the same as in *Attenuatus*; but when preserved in spirits, they become grey.

Lower Yarra. It attains the same size as the preceding.

GALAXIAS DELICATULUS.

D. 10. A. 19. C. 16.

Form elongate. The height of the body is six and eight-tenth times in the total length (to the middle of the caudal); the head is six and two-third times in the same length.

The head is of a light brownish red; the body of a light yellow green above the lateral line, and is covered with faint, irregular, transversal spots, formed of very fine blue points. The lateral line itself is little marked on its anterior portion, but very distinct and of a yellowish colour on the other part of the body; below this line, the colour is of a fine opal white; the eye is silvery. The dorsal fin is of the colour of the back, but its terminal portion is lighter; the caudal is of a yellowish green; the pectorals, ventrals, and anal of a transparent white; the caudal is feebly bilobed.

Yarra River; 4 inches long.

GALAXIAS AMÆNUS.

D. 12. A. 14.

Form rather elongate. The height is five and two-third times in the total length (to the middle of the caudal); head four and one-third times in the same.

Of a light green colour; a brown spot between the eyes, extending a little behind them; the back covered with very minute black points, forming very indistinct, transverse, oblique lines, better marked on the posterior part. A considerable number of points, rather larger than the others, are disposed on the body, and form a double, but rather irregular, longitudinal line on the middle of the back. The lower side of the body is covered with the same punctuation and bands as the back, but the belly is of a rather dark blue, silvery colour; the eye is of a dark green.

Yarra River. From 3 to 4 inches long.

SCOMBRESOCIDÆ.

"Body covered with scales; a series of keeled scales along each side of the belly. Margin of the upper jaw formed by the intermaxillaries mesially, and by the maxillaries laterally. Lower pharyngeals united into a small bone. Dorsal fin opposite the anal, belonging to the caudal portion of the vertebral column. Adipose fin none. Air-bladder generally present, simple, sometimes cellular, without pneumatic duct. Pseudobranchiæ hidden, glandular. Stomach not distinct from the intestine, which is quite straight, without appendages.

"Marine fishes of the temperate and tropical zones, many species entering or inhabiting fresh waters."

HEMIRAMPHUS.

This form may be considered as tropical, one sort alone extending its *habitat* to the Mediterranean Sea; several are found in Australia, but I have only observed one on the shores of Victoria.

HEMIRAMPHUS MELANOCHIR.

Hemiramphus melanochir, *Cuv. & Val.*, vol. xix., p. 41.
——————— intermedius, *Gunther, Catal.*, vol. vi., p. 260.
(The Gar Fish.)

The lower jaw, from its extremity to the point where it meets the upper one, is contained five times in the total length; the height of the body is about sixteen times in the same; and the head, to the extremity of the upper jaw, is five and two-third times in it; the orbit is contained about four times in the same distance. The upper mandible is long and obtuse; the teeth very numerous; the dorsal fin is long, and formed of seventeen rays; the anal has the same form and nineteen rays; the

caudal, slightly emarginated, has fifteen long rays and three short ones on each side; the ventrals are rather small, and the pectorals rather long, and formed of thirteen rays.

The upper parts are of an olive grey, with a broad longitudinal, silvery band on the side; lower parts white The inferior mandible is black, with its extremity red; the eye is of a golden colour. Dorsal fin, obscure; caudal of a light olive, having sometimes an obscure tinge on its posterior extremity; anal and ventrals of a light olive hue; pectorals in part black; and sometimes covered by this colour, but in other specimens it only extends over their posterior part.

This sort was first observed by Messrs. Quoy and Gaimard, at Western Port, during Captain d'Urville's Expedition. It is one of the commonest fishes in the Melbourne Market, during all seasons of the year, and is considered good food. It is equally common in Hobson's Bay as at Western Port, and young specimens are often found in the brackish waters of the lower Yarra. It rarely exceeds 14 inches.

A very young specimen, not more than an inch long, had its back green and a brown spot on the top of the head; the longitudinal band of the sides was of a most brilliant silver colour; the lower jaw was entirely black.

GONORHYNCHIDÆ.

"Head and body entirely covered with spiny scales; mouth with barbels. Margin of the upper jaw formed by the intermaxillary, which, although short, is continued downwards as a thick lip, situated in front of the maxillary. Adipose fin none; the dorsal fin is opposite to the ventrals, and short like the anal. Stomach simple, without blind sac; pyloric appendages in small number. Pseudobranchiæ; air-bladder absent. Gill-openings narrow.

"Southern temperate parts of the Atlantic and Pacific; Japan."

GONORHYNCHUS.

The formation of this genus is due to Gronovius (*Zoophylacion*), but the sort on which it was established was placed by Gmelin and Bloch with *Cyprinus*. It is to Cuvier, in the first edition of the "Règne Animal," that we owe the first modern notion of this fish; but he leaves it with his *Cyprinoidæ*. In the nineteenth volume of the "Histoire des Poissons," Mr. Valenciennes places it in the *Malacopterygii*, between *Chanos* and *Mormyrus*. Dr. Gunther, in his "Catalogue of the Fishes of the British Museum," formed for it a separate family (*Gonorhynchidæ*), between *Scombresocidæ* and *Osteoglossidæ*. The typical species was from the Cape of Good Hope, but Dr. Richardson described and figured a second one from New Zealand and Western Australia, under the name of *Rynchana Greyii* (*Erebus* and *Terror*). I believe, also, that my genus *Gnathendalia* "Memoire sur les Poissons de l'Afrique Australe," p. 56, comes very near to this genus, which was unknown to me at the time; but I have not the specimens with me; it was formed on a small fish I found in great numbers near the Moravian Mission of Gnadenthal, in the Cape of Good Hope colony. I considered it also to belong to the *Cyprinidæ*. In reference to this fish I beg to add, that it is on this subject that Dr. Gunther quotes, for the first time in 1868, my paper on the fishes of South Africa, written by me in 1858, and published in 1861, and he does it, of course, in an abusive way. Considering this sort as a *Cyprinidæ*, I tried, in a short notice, to distinguish it from the other groups then known. He pretends not to perceive that it is by a misprint that the river, which feeds it, is called Genadendal; "evidently,' says he, "meaning the well known Gnadenthal." It is likely that this locality is better known to me who have been there several times, than to Dr. Gunther; and the name given to the fish is a sufficient proof that the mistake belongs to the printer. As to the name itself, I gave it the French pronunciation in a French work. I must also add, that in the excellent map of South Africa, published by Henry Hall, the mountains where it is situated are called Genadendal. No one, of course, expects any indulgence from Dr. Gunther on icthyological subjects, but on geographical ones he might be more lenient, as he could hardly attribute to others,

the often repeated words *matta grosso*, river *capin*, &c., which have no meaning whatever, and are intended for *matto grosso* (great forest), *rio capim* (grass river), &c. All this could only show that I do not known German, nor Dr. Gunther Portuguese; and that nobody, not even the learned doctor, can be universal.

GONORHYNCHUS GREYI.

Rynchana greyi, *Richard., Erebus and Terror, Fishes*, p. 44, pl. 29, figs. 1-6.
Gonorhynchus greyi, *Cuv. & Val.*, vol. xix., p. 212.

(*The Sand Eel.*)

The upper parts of a light lilac, sometimes with marmorated tinges rather more obscure on the back; lower parts white; muzzle and the lower surface of the head pink; sides of the head of a golden tinge; all the fins of a yellowish white; dorsal with a large black spot near the end, the extreme edge remaining white; caudal with a broad black transverse band near its extremity; anal and ventrals with their end black; the eye is sometimes silvery, sometimes golden. A part of this organ is covered on each side by a membrane; the lower and pectoral fins have sometimes a blue tinge.

This fish is most remarkable by its general resemblance to a saurian reptile of the genus *Scincus*. It is often brought in all seasons to the Melbourne Market, where it is esteemed good for the table. It is found in clear quiet water, with a sandy bottom, and, according to the fishermen, it digs holes in the sand. The usual length is from eight to twelve inches; the largest specimen I have seen was a little under fourteen, and the smallest four inches and a quarter; I found this entire in a small shark.

Dr. Gunther unites the Australian sort with the one from the Cape of Good Hope, and also with another from Japan. To characterize this curious assemblage, he says (*Catalogue*, vol. vii., p. 374), "from an examination of these specimens I have arrived at the conclusion, that this species varies considerably in the depth of the body, and especially that young examples, are constantly less elongate than the adult." Having examined several hundred specimens in Melbourne, I may add, that there is no variation whatever in the proportions of the Aus-

tralian specimens, and that the learned doctor might have come to a more simple and natural conclusion, if he had admitted that he was uniting, under the same name, several very distinct species.

OSTEOGLOSSIDÆ

"Body covered with large hard scales, composed of pieces like mosaic; head scaleless, its integuments nearly entirely replaced by bone; lateral line composed of wide openings of the mucus-duct. Margin of the upper jaw formed by the intermaxillaries mesially, and by the maxillaries laterally. The dorsal fin belongs to the caudal portion of the vertebral column, is opposite and very similar to the anal fin; both approximate to the rounded caudal—with which they are abnormally confluent. Gill-openings wide; pseudobranchiæ none; air-bladder simple or cellular. Stomach without cæcal sac; pyloric appendages two.

"Large fresh-water fishes of the tropics."

The genus *Osteoglossus*, which composes this family, was established by Vandelli, on a sort found in the Amazon River, and which I have also observed there; another species inhabits Borneo and Sumatra; and a third (Leichardti) has been found in Queensland, and described by Dr. Gunther. These are all tropical fishes, and it is not likely that this form will ever be found in the southern parts of Australia.

CLUPEIDÆ.

"Body covered with scales; head naked; barbels none. Abdomen frequently compressed into a serrated edge. Margin of the upper jaw formed by

the intermaxillaries mesially and by the maxillaries laterally; maxillaries composed of three, sometimes movable, pieces. Opercular apparatus complete. Adipose fin none. Dorsal not elongate; anal sometimes very long. Stomach with a blind sac; pyloric appendages numerous. Gill apparatus much developed, the gill-openings being generally very wide. Pseudobranchiæ large, except in Megalops. Air-bladder more or less simple.

"Inhabitants of all seas, many species entering fresh waters."

CHATOESSUS.

Formed by Valenciennes, on a small group of fishes, generally from the fresh waters of America and India, and often remarkable by the lowest ray of their dorsal being prolongated in a long filament.

CHATOESSUS EREBI.

Chatoessus Erebi, *Gunther, Cat. British Musuem*, vol. vii., page 207.

———— Comæ, *Richard., Erebus and Terror*, p. 61, pl. 38.

Clupea Thrissa (Kome) *Russel, Fishes, Corom.* ii., p. 76, pl. 196.

Richardson had considered this fish as belonging to the *Kome* of Russell, but Dr. Gunther has found it was distinct.

It is of a light silvery grey on the upper parts, with the edge of the scales rather obscure; this is caused by the presence of numerous and very small black points; the lower parts are very brilliant, silvery, and iridated; the top of the head is purple; the dorsal of a fine grey, the others blueish; ventrals white; the caudal bordered with an obscure tinge; the sides of the head are rather yellow, as are also the eyes.

Very scarce in the Melbourne Market, and being very much

esteemed as food, it sells at a high price; I cannot discover if it has a common name.

The two or three specimens, I have seen, were found after very bad weather.

It appears also to be found in fresh water, being noticed by Blandowski amongst the sorts of the Murray River. He says the natives call it *Manur*; and adds, "leaps frequently out of the water, and is easily caught by its elongated ray in thin fine nets, laid by the natives horizontally on the water. The fish gets entangled in the twine, and cannot escape. It is most numerous in the Darling, but is also found above and below the junction of the Murray and Darling Rivers. In June and July it is considered a delicacy by the natives, and forms their principle food during these two months. The young women are not permitted to eat them, from a belief, that if they did all the fish in the river would die; but in reality, because it is thought to be an aphrodisiac, this fish being very fat and nourishing. It is also placed on the tops of graves, to point out the direction in which he lives who caused the death of the inmate; therefore this fish is much esteemed."

It is from ten to fourteen inches long.

I have not yet been able to obtain any specimens from the fresh waters, and I cannot say if it belongs to the sort which inhabits Hobson's Bay. The largest I have seen of the latter is thirteen inches long.

I find in the "Industrial Progress of New South Wales," 1871, page 770, that *Chateossus Erebi* is found in the north Australian rivers, the Murray, Clarence, Burnett, Fitzroy, &c., and that according to Mr. Masters, it is called *Bony Bream* by the Burnett settlers.

ENGRAULIS.

In following Dr. Gunther's division of this genus, this sort has to be placed amongst those that have none of their pectoral rays prolonged; the teeth in the jaws about equal in size; the origin of the dorsal fin in advance of that of the anal, and teeth in both jaws.

The known sorts are not numerous. All have very numerous rays to the anal.

ENGRAULIS ANTARCTICUS.

(*White Bait.*)

The height of body seven and one-quarter times in the total length; head four and one-quarter in the same; eye three and one-fifth in length of head; the muzzle considerably longer than the mandibula, and embracing it; the upper jaw presents a line of very minute and equal teeth, and the lower one has a similar line of still smaller ones. The dorsal is inserted at equal distance from the snout and the base of the caudal, it is as high as the body; of fifteen rays, the first much shorter than the others, but the second and fifth rather longer than the following; caudal strongly bifurcated; the lateral rays being about one-third longer than the height of the body; it is formed with twenty long rays, and five or six shorter ones on each side; anal rather lower than the dorsal, having twelve rays of which the first is short. From the posterior end of the anal the distance to the lateral root of the caudal is contained three times in the distance from its beginning to the end of the mandibula, and twice from the superior root of the caudal to the anterior one of the dorsal; the ventrals are rather smaller than the pectorals, and are formed of only one simple ray, and five branched ones; they are placed a little in advance of the dorsal; the pectorals are formed of fifteen rays.

The colour of the upper parts is of a light greyish green, with purple tinges; the head is brown; the lower parts are very silvery; there is a narrow, yellow, longitudinal streak from the upper part of the operculum to the base of the caudal, and below this extends a broad longitudinal, silvery, and very brilliant band, having sometimes a blue tinge; the operculum and throat are very iridescent; the fins are diaphanous; the caudal is yellow at its base, and obscure towards the extremity; eye silvery. After having been in the liquor the fish appears very silvery, with the upper parts of a dark blue.

Very common on the Melbourne Market during the whole year.

Dr. Gunther states that the common European anchovy *Engraulis Encrasicholus* is found in Australia; but this is only said to satisfy his usual tendency to unite, under the same species, fishes from all parts of the globe, and as he himself

finds that Australian specimens present constant differential characters in the number of the rays, he forms with them a *named variety* (Antipodum). In following out this system, as the same ichthyologist has, also, in this genus *named Subgenera*, a single specimen would have two generic and two specific names, which would, I should think, be sufficient to disgust the most fervent student from zoological study.

In all cases *Antarcticus* cannot be *Antipodum*, as Dr. Gunther says that it has no teeth at the lower jaw, nor a silvery band along the sides.

CLUPEA SAGAX.

Clupea sagax, *Jenyns*, *Beagle Fishes*, p. 134.
——————— *Gunther*, *Catal.*, vol. vii., p. 443.
Alausa melanosticta, *Cuv. & Val.*, xx. p. 444.

Professor M'Coy has published the following interesting account of this fish "Intercolonial Exhibition," 1866-67: "Of the family *Clupeidæ*, or herrings, there is only one of much importance in our seas. A specimen of this was first brought to me in August, 1864, from a small shoal then seen for the first time in Hobson's Bay, and quite unknown to the fishermen. It was supposed by the sender to be the *Yarra Herring*, or *Grayling*, gone out to sea; but on examination I found it was the *Clupea Melanosticta* of Temmink, or the species of *Pilchard*, so abundant on the shores of Japan. In the same month, in the succeeding year, they appeared in great abundance in the Bay, and were caught by thousands for the market. After remaining for a few weeks they disappeared until the same time in 1866, when they arrived in such countless thousands, that carts were filled with them by simply dipping them out of the sea with large baskets. Hundreds of tons of them were sent up the country to the inland markets, and through the city, for several weeks, they were sold for a few pence the bucketful while the captains of the ships entering the Bay reported having passed through closely packed shoals of them for miles. They may be now probably expected every year as a very important addition to the food fishes of the country. I imagine some alteration in the bed of the sea, from the earthquake disturbances north of Australia, about that time,

may have facilitated or induced the extension of the shoals in such unusual quanties from Japan to our coasts. Duperrey (or Lesson and Garnot) found it in New Zealand, and Cuvier and Valenciennes referred their specimen to the genus *Alausa*. I find, however, that the authors of the "Histoire des Poissons" were in error, and Temmink in the right,—the former assigning five, and the latter seven gill-rays; and it has also a row of teeth on the tongue, as was correctly stated by Temmink, and erroneously denied by Cuvier and Valenciennes. The fish is therefore a *Meletta*, and not an *Alausa*, and should be referred to as the *Meletta Melanosticta* (Tem.)"

All that the Professor says about the extraordinary occurrence of the shoals of the fish is perfectly correct, and they have since that time made their appearance every year; but in 1871 a few only began to be seen on the 16th of November, and they became more abundant in December and January following, but at all times in much less numbers than those of other years, but I cannot agree with Professor M'Coy about the name of this fish, and it is impossible for me to see any teeth on its tongue; I therefore think that its genus was well named by Cuvier and Valenciennes. That it is not the *Melanosticta* of Schleg. is still more evident, as that sort has sixteen or seventeen rays to its anal, while the Australian fish has eighteen, and this is one of the characters of *Sagax*, which has also the round black spots on the sides. Dr. Gunther has well described and distinguished these two sorts, and if Professor M'Coy has not been mistaken in regard to the existence of lingual teeth, it would show that the two sorts appear in the waters of the southern parts of Australia.

According to Dr. Gunther, *Clupea Sagax* inhabits the western coast of America, from California to Chili, Japan, and New Zealand.

MELETTA.

This genus of Cuvier and Valenciennes, formed on sorts who have only teeth on the tongue, and none on the jaws, is not admitted by Dr. Gunther, who considers the dentition in this group of fishes as too rudimental to be taken as a generic character; but at the same time he takes it as his principal character of the division of the genus. If it is constant enough to furnish a safe guide for

the recognition of the species, it seems difficult to understand how it has no generic value.

In the little fish I mention the upper jaw is shorter than the lower one; the abdomen is serrated from below the pectorals, or even a little in advance of their insertion; the anal fin has twenty rays; no teeth are visible on the jaws, nor on the palate, but some exist on the tongue; dorsal inserted a little behind the ventrals, which are well developed. A well-defined broad, silvery, longitudinal stripe runs on the sides.

The assemblage of these characters would place this sort in Dr. Gunther's genus, *Clupea;* but the situation of the dorsal fin in respect to the ventrals, is in opposition to all he says on this subject in his descriptions; Cuvier and Valenciennes, on the contrary, state, in speaking of *Meletta Vulgaris*, that the ventrals are rather in advance of the dorsal.

MELETTA NOVÆ-HOLLANDÆ.

Meletta Novæ-hollandiæ, *Cuv. & Val.*, vol. xx., p. 376.

(*The Smelt.*)

Height four and a-half times in the total length; head five and a-half in the same; eye as long as the snout, and contained three and a-half times in the head; the lower jaw longer than the upper; mouth extensible; no teeth on the palate; maxillary extending to below the front edge of the eye; body compressed; forty-six scales on the longitudinal line; sixteen rays to the dorsal; twenty to the anal; the caudal has nineteen rays, with five short ones on each side; the pectorals fourteen rays. The height of the first ray of the dorsal is equal to the distance from the end of the snout to the anterior edge of the eye; the other rays go on decreasing as they extend backwards, and the last are only one-half of the height of the first; the caudal is very strongly bifurcated, being twice as long on its sides as at its centre; the ventrals are as long as the dorsal, and a little shorter than the pectorals.

The general colour is of a light green, with a broad, well-marked, silvery streak on each side; the belly is white; the operculum and throat are silvery and iridescent; the dorsal and caudal are yellow, and the other fins translucid; the eye silvery.

This little fish is very abundant at times in the Melbourne Market; its length is about four inches.

The specimens studied by the French ichthyologists were brought from Sydney by Quoy and Gaymard, and I find in Mr. Gerard Krefft's very interesting "Report on Australian Vertebrata," (Intercolonial Exhibition, 1870), that at Sydney it bears the vernacular name of *Sprat*.

Nota.—There is no doubt that this is the *Meletta Novæ-Hollandæ* of Cuvier and Valenciennes, but it is very doubtful if it is the *Clupea Novæ-Hollandiæ* of Dr. Gunther, as this very accurate author not only describes the insertion of the ventrals as being below the anterior half of the dorsal fin; but also places it amongst the sorts having minute teeth on the palate.

SYMBRANCHIDÆ.

"Body elongate, naked or covered with minute scales; barbels none. Margin of the upper jaw formed by the intermaxillaries only, the well-developed maxillaries lying behind and parallel to them. Paired fins none. Vertical fins rudimentary, reduced to more or less distinct cutaneous folds. Vent situated at a great distance behind the head. Gill-openings confluent into one slit, situated on the ventral surface. Air-bladder none. Stomach cæcal sac or pyloric appendages. Ovaries with oviducts.

"Fresh waters and coasts of tropical America and Asia. Coasts of Western Australia and Tasmania."

Only represented in the Australia waters by *Chilobranchus Dorsalis*, Richardson; which I have not seen.

MURAENIDÆ.

"Body elongate, cylindrical or band shaped, naked or with rudimentary scales. Vent situated at a great distance from the head. Ventral fin none. Vertical fins, if present, confluent, or separated by the projecting tip of the tail. Sides of the upper jaw formed by the tooth-bearing maxillaries, the fore part by the intermaxillary, which is more or less coalescent with the vomer and ethmoid. Humeral arch not attached to the skull. Stomach with a blind sac; no pyloric appendages. Organs of reproduction without efferent ducts.

"Inhabitants of the fresh waters and seas of the temperate and tropical regions."

ANGUILLA.

Eels, which constitute this genus, seem to be generally found in the fresh waters of almost all climates; but more particularly in those of the temperate countries.

The first notice of an eel in the New Zealand rivers was due to J. E. Gray, in the appendice to Dieffenbach's travels to that island.

Dr. Richardson described, in 1848, under the name of *Australis*, another sort from Tasmania, which is said also to be found in New Zealand. In the fishes of the *Erebus* and *Terror*, he describes two other sorts, one *Aucklandi*, from the Auckland Islands; and another, *Labrosa*, of which he did not know the precise locality. This latter is of a remarkable form, having its dorsal fin commencing rather nearer to the gill-opening than to the anus, and may very well be an inhabitant of the sea. The others are all from fresh waters. They may be distinguised thus:—

(*A.*) Beginning of the dorsal considerably before the anus.

(*a.*) At about two inches, in a specimen of twenty inches long—*Dieffenbachii.*

(*b.*) At one inch, on a specimen of seventeen inches long—*Aucklandi.*

(*B.*) Beginning of the dorsal rather before the anus—*Australis.*

In the latter the pectorals are very small, and are much larger in *Aucklandi.* I must add that Dr. Gunther considers *Dieffenbachii* as the same as the European *Latirostris*; but it is evident that either this zoologist is mistaken, or that this eel has been imported to New Zealand, as several other European fishes have been to Australia.

Eels seem to extend over all the antarctic regions, and in my notice of the fishes of the Cape of Good Hope I mentioned a sort found in that part of South Africa.

ANGUILLA AUSTRALIS.

Anguilla Australis, *Richard., Zool. Trans.*, vol. iii., p. 157,

———————— *Richard., Erebus* and *Terror, Fishes*, vol. i., p. 112, pl. 45.

THE EEL.

This is the common eel of the Yarra, and of several other streams of Victoria and Tasmania; but it appears doubtful whether it extends to New Zealand. Dr. Richardson has already pointed out some slight differences between the specimens from each locality.

This eel, though covered with minute scales, arranged in a lattice work way, is very smooth and slippery. The pectorals are not longer than the cleft of the mouth.

Its colours are very changeable; generally it is of a dark green, with the lower parts lighter and grey; sometimes it shows faint transverse spots or bands of a more obscure tinge. The dorsal and anal are often in a great part yellow.

It attains large dimensions.

ANGUILLA REINHARDTII.

Anguilla Reinhardtii, *Gunther*, vol. viii., p. 27.

———————— *Steindachner* (Gunther), *Ak Wiss. Wien*, 1867.

Very much like *Australis*, and generally confounded with it by the fishmongers. The differences consist in the following:— 1st, the body is thicker. 2nd, the tail is broader at its end. 3rd, the skin is much more rough. 4th, the pectorals are considerably larger, and the cleft of the mouth is not more than two-thirds their length. 5th. the dorsal begins on, or a little below the line of the anal, but there is sometimes a little difficulty, with all these fishes, to ascertain correctly where a fin begins. 6th, the teeth are shorter, thicker, and more blunt, particularly those situated towards the interior of the mouth. The lips are broader, more fleshy, and extend laterally; the colour is almost black, with the lower parts of a dark grey; the lips are of a reddish pink, and the eye is yellow with orange tinges.

From Western Port, and, I believe, also from the Mordialloc river. Average size from twenty to twenty-two inches.

CONGER.

Genus formed by Cuvier, but now restricted to three or four sorts, characterised by the absence of scales; the dorsal fin commencing behind the base of the pectorals, and the jaws armed with an external series of closely set teeth.

CONGER WILSONI.

Gymnothorax wilsoni? *Bloch; Schneid.*, p. 529.

This sort attains very large dimensions, and its average size is from four to five feet long. It is sometimes found in Hobson's Bay, but appears to be much more frequent near Hobart Town, being often brought salted from that town to the Melbourne Market. The height is about twenty times in the length, and the distance from the anterior end to the opening of the gill is contained about eight times in the same. The head is elongate; the teeth are all similar; they are elongate, straight, blunt, and placed very near one another; they form a small cluster in front of the jaws, the anterior ones being smaller than those placed backwards. Inside of this line of teeth, there is a sharp, crenulated and ossified ridge. The tongue is smooth. The lateral line is well marked to the end of the body; it is rather curved over the pectorals, and, on the dry specimens, appears formed of a succession of notches. The dorsal fin begins behind the pectoral,

at about a distance, from the end of this fin, equal to its own heighth; it is low, but extends all along the back, and has about three hundred and twenty rays, those of the posterior part being so crowded as to make it almost impossible to be accurately counted; the beginning of the anterior portion of the dorsal has no rays. The anal begins at a little before the half of the length of the body; it is formed of about two hundred and sixty rays, but these are subject to the same observation as the last ones of the dorsal. The pectorals are of about one-fourth of the length of the head, and formed of fifteen rays.

The general colour is of a shining brownish black, which degenerates in a greyish white on the belly. The lateral line is black, and there are large, marbled, pinkish white spots on the posterior parts of the body.

I have never heard of any other *Conger* being found in the southern part of Australia, and I do not know on what foundation it is stated that *Conger Vulgaris* inhabits the coast of Tasmania.

CONGROMURÆNA.

Dr. Kaup separates from *Conger* this and some other sorts. The Australian fish is remarkable by its dentition. In this, the anterior teeth of the upper jaw are short, conic, and very acute; they are disposed in a cluster of a rather triangular form. On each side, behind them extend two rows of rounded molar teeth, and on the vomer are two other rows of the same form, but larger. There are also teeth on the palatines, but smaller, and disposed in four rows; those of the lower jaw are similar to those of the palatines. The anterior nostril has the form of a short tube, placed under the end of the snout; the tongue is smooth. The lower jaw is shorter than the upper one, and the cleft of the mouth extends to the centre of the eye; this latter is very large.

CONGROMURÆNA HABENATA.

Congrus Habenatus, *Richard.*, *Erebus* and *Terror*, *Fishes*. p. 109, pl. l., figs. 1-5.

The dorsal begins a little behind the insertion of the pectorals; it is formed of about one hundred and eighty rays, extends all

round the posterior part of the body, and joins the anal, which is formed of about one hundred and twenty rays.

The height of the body is about eighteen times in its length; the muscular flakes are very visible, and form arched lines all along the body.

The upper parts of the body are of an olive green, with the belly of a blueish white; the sides are silvery, and the head is purple; the fins are olive green, the dorsal and anal having a black border.

I believe this sort to be the *Habenatus* of Richardson, and that the slight differences in the disposition of the teeth are caused by age, as his specimens seem to have been older than mine.

Total length ten inches.

Only seen once in the Melbourne Market, in the month of September. Dr. Richardson's specimen was from New Zealand.

PEGASIDÆ.

"Body entirely covered with bony plates, anchylosed on the trunk, and movable on the tail. Barbels none. The margin of the upper jaw is formed by the intermaxillaires and their cutaneous prolongation, which extends downwards to the extremity of the maxillaries. Gill-cover formed by a large plate, homologous to the operculum, præoperculum, and suboperculum; interoperculum a long fine bone, hidden below the gill-plate. One rudimentary branchiostegal. The gill-plate is united with the isthmus by a narrow membrane; gill-opening narrow in front of the base of the pectoral fin. Gills four, lamellated. Pseudobranchiæ and air-bladder absent; one short dorsal and anal fin, opposite to each other. Ventral fins present. Ovarian sacs closed. Indian Ocean and Australian seas."

Two sorts of *Pegasus*,—*Natans* and *Lancifer*, are found in Australia: the first in Queensland, and the second on the coast of Tasmania; but I have not yet seen either.

Order V. LOPHOBRANCHII.

"The Gills are not laminated, but composed of rounded lobes, attached to the branchial arches. Gill-cover reduced to a large simple plate. Air-bladder simple, without pneumatic duct. A dernal skeleton, composed of numerous pieces arranged in segments, replaces more or less soft integuments. Muscular system not much developed. Snout produced. Mouth terminal, small, toothless, formed as in Acanthopterygians."

SYNGNATHIDÆ.

"Gill-openings reduced to a very small opening near the upper posterior angle of the gill-cover. One soft dorsal fin; no ventrals, and sometimes one or more of the other fins also absent.

"Chiefly marine fishes, occurring in all parts of the tropical and temperate regions; many species entering fresh waters."

HIPPOCAMPUS.

This name was given by Dr. Leach to the fish commonly known as *Sea Horse*, and has been adopted by all authors. It has since been restricted, and Dr. Gunther gives the genus the following characters:—"Trunk compressed, more or less elevated, composed of from ten to twelve rings; shields with more or less prominent tubercles or spines; occiput compressed into a crest, terminating at its superoposterior corner into a prominent knob (coronet). Supraorbital, temporal, and humeral regions, with

prominences; tail prehensible, finless; pectoral fins. The males carry the eggs in a sac at the base of the tail, opening near the vent.

"Inhabitants of all seas of the temperate and tropical regions. they are pelagic fishes, which attach themselve to seaweeds, or other floating substances, and are liable to be carried by currents to great distances, consequently some specimens are spread over different parts of the globe. The species are difficult to distinguish, on account of the great amount of variation, to which the development of the tubercles, shape of shields, and length of snout, are subject; the number of dorsal rays appear to be very constant."

All this is perfectly exact; but I am not certain that the length of the snout, and form of the body shields, does vary so considerably in the same sort, at least I have seen no example of it, and the presence of filaments is, I believe, only to be observed in the males of a few sorts, except in *Phyllopteryx*, where they are constant in both sexes.

HIPPOCAMPUS NOVÆ-HOLLANDIÆ.

Hip. Novæ Hollandiæ, *Sitzgsber, Ak. Wiss. Wien.*, 1866 (Dr. Gunther)

——————————— *Gunther, Catal.*, vol. viii., p. 201.

Dorsal fins with seventeen rays; the occipital coronet forms a little crown of five branches, leaving like a small cratere between them.

The body is yellow, covered with small red spots; dorsal fin with a longitudinal brown narrow band; the rays marbled brown and white; back generally more or less marbled with brown.

HIPPOCAMPUS TRISTIS.

Same form as the preceding, but the tail shorter; dorsal fin with fourteen rays; the shields of the body covered with transverse stripes; the anterior abdominal crest of the body divided in points generally bifid.

Dorsal fin with a narrow longitudinal brown band, and the rays marbled with the same colour. No filaments.

One specimen.

HIPPOCAMPUS BREVICEPS

Hip. Breviceps, *Peters, Monatsber., Berlin,*. 1869, p. 710.
————————*Gunther, Catal.*, vol. viii., p. 200.

Dorsal fins with twenty two rays; the tubercles are strong.

The colour, during life, is of a light grey, with the inner parts yellow; these are covered with small, dark, red dots; the other parts of the body present numerous white spots, surrounded by a black circle; the tail is ringed with yellow and brown; the eye is yellow.

The male has numerous filaments on the upper part of the head and back they are simple, but inserted two by two; their colour is black, and some of them are ended by a small yellow brush. The egg pouch is of a fleshy pink, edged anteriorly with black.

Seen several specimens, but never over one inch long, when curled up.

Nota.—Dr. Kaup's fig. 5, pl. 1, *Lophob.*, (*Hip. Japonicus*), has a remarkable resemblance with this sort.

PHYLLOPTERYX.

Formed by Dr. Kaup on some large Australian sorts, very remarkable by the long filaments that adorn their body.

PHYLLOPTERYX FOLIATUS.

Syngnathus Foliatus, *Shaw, Gen. Zool.*, vol. v., p. 456, pl. 180
————— Tæniopterus, *Lacep. Ann. Mus.*, vol. iv, pl. 58

This singular fish is said by the fishermen to be scarce; one of them told me that he had once found eighteen or twenty pairs in his net, but had often been several years without finding a single specimen. I have not yet seen it alive, but according to a drawing made by Mr. Angus, and published by Dr. Gunther, "Proc. Zoological Society," 1865, its colours seem very beautiful; but they are subject to considerable variations; in some large specimens that I have just received from Hobart Town, through Mr. Lavington Roope, and which, having been only a few days in liquor, still maintain much of their brillancy, I find that the fish is of a fine carmine colour, covered with numerous

oscellated white spots, which extend on the head, the snout, and the upper side of the tail; the anterior edge of the body is of a fine yellow; the snout, back, and upper parts of the body are of a dark violet carmine; the lower side of the tail is of a fine reddish brown; the transverse violet bands of the anterior part of the body are still visible; the fins are pink, with a large rounded black spot on the dorsal, which extends nearly to the edge; the filaments are of a dark brown; the operculum, and prœoperculum are covered with fine radiated striæ.

It bears at Hobart Town the name of *Sea Dragon*.

SYNGNATHUS.

This genus used to contain the entire family; but it has been very much restricted by Dr. Kaup: Dr. Gunther characterizes it thus—"Body with the ridges more or less distinct; the dorsal edge of the trunk not being continuous with that of the tail; pectoral fins well developed; caudal present; dorsal fin opposite or near to vent,; humeral bones firmly united into the *breast ring;* male with an egg pouch on the tail, the eggs being covered by cutaneous folds."

Inhabiting all the seas of the temperate and tropical regions.

SYNGNATHUS SEMISTRIATUS.

Syngnathus Semistriatus? *Kaup*; *Loph.*, p. 48.
———— Semifsaciatus? *Gunther*, *Catal.*, vol. VIII, p. 462.

Lateral line interrupted; the trunk is very arched, and contained four and a-half times in its length; the snout, from its extremity to the anterior edge of the eye, is equal to the distance from the posterior edge of the eye to the end of the third body ring; it is long, almost cylindrical, rather turned up; head without ridges, but covered with strong convergent striæ; these cover also the shields of the body. The head is contained one and two-third times in the trunk, and this, including the head, is one and one-third in the tail; anus under the first third of the length of the dorsal; this is large and formed of thirty-eight rays; caudal fin very small as are also the pectorals; the rings of the trunk number twenty and those of the tail forty-eight to fifty.

The general colour is of a light green, with the lower side of

the head and the belly of a fine orange yellow; on the snout there are two white longitudinal stripes, edged with black, one placed laterally, and extending over the entire length; and the other on the upper part, and only on the second half of the snout; on the head there are also two similar stripes, one arched and extending from the posterior edge of the eye to the end of the operculum, on the upper part of the head, and the other similar but broader, and almost straight, extending on the side, in continuation to the one of the snout; the upper one extends on the back to the end of the trunk; below are numerous, very small, rounded white spots, surrounded by a black circle (they are more visible on the dried than on the living specimens); the dorsal has a greenish tinge; the eye is white, with a green mark on its upper edge.

I have only seen one specimen, in the month of September, it was eight and a-half inches long.

Nota.—I believe this to be the *Semistriatus* of Kaup; but the snout seems considerably longer.

UROCAMPUS.

Formed by Dr. Gunther on the following characters:—"Body elongate, compressed, with distinct longitudinal ridges; the upper edge of the trunk continuous with that of the tail; lateral line continuous with the lower caudal edge; tail elongate, quadrangular, tapering; pectoral and caudal fins developed; the dorsal is placed entirely on the tail, at a great distance behind the vent."

The only sort known is from Manchuria, but the Australian fish I here describe appears to me to belong to this genus.

UROCAMPUS CARINIROSTRIS.

Snout turned rather upwards, very short, being contained once and a-half in the diameter of the eye, and nearly three times in the length of the head; it is not abruptly separated from the forehead, and goes slanting to its extremity; the supraorbital ridges are very strong, and sometimes converge in front to form the medium ridge of the snout; in other specimens there is between them a rounded sharp ridge; there is a short spine at the anterior angle of the eye; the eyes are very prominent;

occiput and muchal shields with ridges ; operculum covered with strong radiated striæ, and almost carinated ; the pectorals are not much longer than the orbit, and not quite one-half of one of the body shields ; the snout is contained about seven times in the trunk ; the distance from the anus to the beginning of the dorsal is about equal to one-half its distance to the end of the snout ; the body has three ridges, the upper one much more marked than the others ; the central one ending at the base of the tail ; each shield has two small longitudinal ridges, and is perpendicularly striated ; the osseous rings number nine on the body, seven more on the tail before the dorsal, which begins on the seventeenth, and extends over the three following ; behind these are forty-five or forty-six others ; the caudal is very minute ; no anal ; the tail is tapering and very thin, its ridges are much less marked than those of the body.

The general colour is a light green, with dark spots corresponding to the centre of the body rings ; eye of a golden hue. There is a rather indistinct black stripe on the side of the snout.

The length of my largest specimen is three and a-half inches. I have seen it rather commonly in the months of January and February ; taken with shrimps. Its motions are very active.

STIGMATOPHORA.

The most apparent characters of this genus of Dr. Kaup is the absence of a caudal fin, and the tail going tapering to its end.

Dr. Gunther characterizes it as follows :—" Body depressed, with the ridges obsolete, those of the trunk being continuous with those of the tail ; shields covered with soft skin ; pectoral fin developed ; caudal absent ; tail tapering to a very fine point ; dorsal very long ; males with a caudal pouch, formed by cutaneous folds," Australia.

All this applies exactly to the species I have under examination, with the exception of the soft skin covering the shields ; I find them similar to the other *Syngnathidæ*.

STIGMATAPHORA NIGRA.

Stigmataphora Nigra., *Kaup, Lophob.*, p. 53.

——————————— *Gunther, Catal.*, vol. viii., p. 190.

The general form is very slender ; the height of the body being, in most specimens, contained about twenty-four times in the

total length, but in some the abdomen is rather inflated ; the snout is long, slender, and nearly equal in all its length, except at its extremity, where it is strongly turned upwards ; from the end of the snout to the anterior edge of the eye, the distance is equal to that between the posterior edge of that organ and the end of the third segment of the body ; the head is contained a little over six times in the total length, and the snout about ten times in the same ; it is one and one-third longer than the remainder of the head, and has some longitudinal ridges on its upper part. Seen from the upper surface, the posterior edges of the snout form on each side a point over the anterior edge of the eye, which is deeply sunken ; the mouth is directed upwards ; the operculum has a longitudinal ridge running rather obliquely ; dorsal very long ; no caudal ; the pectorals are very short ; I cannot distinguish any anal, and I find at its place the long cutaneous egg pouch in the males, and nothing in the others ; but as all authors say they have one, it is likely that it exists, though I could not discern it. The anal is below the eighteenth segment of the body. I only find forty-two or forty-three body-rings, but those of the posterior part of the tail are so exceedingly minute as to leave some doubt in this respect ; the body is depressed below, which gives its section a triangular appearance ; the body-ridges extend, on a straight line, to the extremity of the tail ; the shields are finely punctured, and perpendicularly striated ; the tail terminates generally in a fine point, but in some specimens it is rather blunt ; the operculum presents no ridge.

Colour of a light green ; the snout generally bears faint traces of transverse bands rather darker than the ground colour ; the whole body is covered with very minute red dots ; the edge of the rings are rather dark ; in some specimens the longitudinal ridges are of an orange red colour ; eyes green, strewed with black.

I have seen numerous specimens, caught in February with shrimps ; their length varies from two to near four inches.

Nota. — Though this description does not in all points correspond to *Nigra*, I believe that my specimens belong to that sort.

STIGMATAPHORA BOOPS.

Amongst the specimens of the *Nigra* I observe several similar to the others, but with enormous globular eyes; these are very prominent. I could not, up to the present, ascertain if they form a particular species.

Order VI. PLECTOGNATHI.

"Teleosteous fishes with rough scales, or with ossifications of the cutis in the form of scutes or spines; skin sometimes entirely naked. Skeleton incompletely ossified, with the vertebræ in small number. Gills pectinate; a narrow gill-opening in front of the pectoral fins. Mouth narrow; the bones of the upper jaw generally firmly united. A soft dorsal fin, belonging to the caudal portion of the vertical column, opposite to the anal; sometimes elements of a spinous dorsal besides. Ventral fins none, or reduced to spines. Air-bladder without pneumatic duct. Nearly all are marine fishes."

SCLERODERMI.

"Snout somewhat produced; jaws armed with distinct teeth in small number; skin with scutes or rough. The elements of a spinous dorsal and ventral fins generally present. Marine fishes of the temperate or tropical regions."

MONACANTHUS.

These fish being almost all confined to the tropical seas of the world it is remarkable to find that a considerable number of sorts have been observed in the most southern parts of Australia, but they only appear in the Straits of Bass in the warm months of the

year (November, December, January, and February). They are not used for food, and the fishermen are in the habit of throwing them away whenever they catch them. It is probably due to this circumstance that I have yet only been able to obtain three of these sorts. They are all known under the name of *Leather Jackets*.

MONACANTHUS PERONII.

Monacanthus Peronii, *Hollard, Ann. Sc. Nat.*, 1854, vol. xi., p. 356, pl. 13, fig. 4.

———————— *Gunther, Catal.*, viii., p. 249.

This sort enters in Dr. Gunther's division, characterized by "anal fin with less than forty rays; dorsal spine with four series of barbels, the edges being equidistant, and armed with barbs." The upper profile is concave in front of the dorsal spine, and convex behind it; the central profile is considerably distended. The body appears entirely granulated; these granulations are formed of minute tubercles; towards the tail and near the anus they take a more spinous form. The dorsal spine is inserted over the centre of the eye; its length is equal to one and a-half the transverse diameter of the orbit; it is straight and even a little curved outwards near its end; the barbs that extend on its edges are strong, particularly the external ones; the second ray is contained four times in the length of the spine. The dorsal is formed of thirty-three rays, the caudal of twelve, the anal of thirty-two, and the pectorals of thirteen. The ventral spine is small, fixed, and armed with five or six rather strong spinelets.

The colour is of a dark brown, the back much lighter, and of a dirty yellow on the belly; the lower parts are covered with very irregular brown spots; the dorsal and anal have an orange tinge.

Only seen one in April; length six and a-half inches.

MONACANTHUS FORSTERI.

The anterior upper profile, in front of the dorsal fin, is concave, and the posterior one convex; the general form is elongated, being contained two and one-third times in the total length; the snout from its extremity to the anterior edge of the orbit is contained four and one-third times in the same length; the

lower profile is more convex than the upper one. The snout is produced; the dorsal spine is rather slender, short, and straight; it is contained once and one-fifth in the transverse diameter of the eye; it is inserted over the centre of the orbit, straight, or rather bent forwards, compressed, and quadrangular, the edges being equidistant, and armed with rather short barbels, directed downwards; there is no appearance of a short second ray. The second dorsal has thirty-four rays; the anal twenty-seven; the caudal is long, of twelve rays; the pectorals of thirteen; no ventral spine; the body is covered with very minute granulations, which become spinous on the tail. The four large anterior teeth are almost square.

The upper parts of the body are of a dark green, and the lower ones white; the whole is covered with very irregular black spots, particularly numerous on the sides; fins of a light greenish colour.

I have only seen a single specimen in the month of May; it was not quite three inches long.

It is not impossible that this should be *Balistes Scaber*, Forster, (*Bl. Shœn.*, p. 477); it evidently comes near *Peronii*, but its form is exactly like the one of *Alutarius Paragaudatus*, as represented by Richardson, "Erebus and Terror, Fishes," p. 66, pl. 39. (*Spilomelanurus*, Quey and Gaim.)

MONACANTHUS PRASINUS.

This comes in the division characterised by—"anal fin with less than forty rays; the front ones much closer together than the hinder series," which constitutes, for Dr. Bleeker, his genus *Pseudomonacanthus;* the anterior profile is almost straight, the posterior one rather convex; the lower profile is regularly arched, when the pubic bone is not extended; the dorsal spine is inserted over the posterior third of the orbit; it is arched, and carries very strong barbs directed downwards; the back ones are much larger than the others; this spine is twice and a quarter as long as the diameter of the orbit, and is very strong; the inner ray is about one-third of the spine; the second dorsal has thirty-five and the anal thirty-four rays; the pectorals thirteen; the ventral spine is fixed and formed of a small net of spinelets, three of which, on each side, are much larger than the others, and curved; the height of the

body is contained, when the pubic bone is extended, two and two-third times in the total length; the two front teeth are triangular and by their union form a pointed edge; the others are also pointed; the body is entirely covered with a very fine velvety granulation.

The colour is entirely of a light and rather brilliant green, darker on the back, rather yellow on the belly; the eyes and teeth are also green; the caudal of the same colour; second dorsal and anal transparent, rather dark on the edge.

Only seen once in the month of March; it is rather over two and a-half inches long, and has an oval form.

Nota. None of the three sorts of *Monacanthus*, I here describe, have any particular spines or spots on the sides of the tail.

GYMNODONTES.

"Body more or less shortened. The bones of the upper and lower jaw are confluent, forming a beak with a trenchant edge, without teeth, with or without medium suture. A soft dorsal, caudal, and anal are developed,—approximate. No spinous dorsal. Pectoral fins, no ventrals.

"Marine fishes of the temperate and tropical regions. Some species confined to fresh water."

Group TETRODONTINA.

Tail and caudal fin distinct. Part of the œsophagus much extensible, and capable of being filled with air; no pelvic bone; air-bladder present.

TETRODON.

Found in all the warm or tropical seas of the world. They are, generally poisonous. I have observed two sorts on the shores of Hobson's Bay.

TETRODON HAMILTONI.

Tetrodon Hamiltoni, *Richard., Erebus & Terror*, p. 63, pl. 39.

(*Toad Fish.*)

The dorsal is formed of nine rays, and the caudal also of nine ; the anal of eight ; and the pectorals of fifteen. The body is covered with small pores, and is pretty smooth.

The upper parts are green, marbled with a darker tinge ; the lower white ; fins of a greenish yellow ; eye of a yellowish green, with an interior bright red line.

The usual size is from four to five inches, some adults measure up to nine. Very common. It sometimes goes up the river to Melbourne.

TETRODON HISPIDUS.

Tetrodon Hispidus, *Lin. Syst. Nat.*, vol. i., p. 411.
———————— *Lacep.* vol. i., p. 487, pl. 24, fig. 1.
———————— *Bloch*, pl. 142.

(*Toad Fish.*)

Dorsal of eleven rays ; caudal rather emarginated, of eleven rays ; anal of six ; pectorals of thirteen.

The entire body is covered with very minute spiny asperities upper parts of a greyish green, the lower of a pinky white ; numerous large irregular brown blotches on the upper part ; lips rosy ; dorsal white, with its internal half green ; caudal with a green tinge ; anal white ; pectorals of a light green, with a pink tinge on its external edge ; eye blue, with a lower brown external line.

ARACANA.

Separated from *Ostracion* by Grey, on the character of the carapace not being closed behind the anal fin. This is easily seen in preserved specimens, but does not appear externally in fresh ones. These fish are mostly Australian, and are adorned with beautiful colours.

ARACANA AMŒNA.

Carapace with five ridges, the abdomen forming an inferior one ; spines short, thick, conical, blunt, and not arched, placed one above the orbit, and directed externally ; two on each side of the back directed posteriorly ; below these are others much shorter

still, and which are only white striated tubercles: they are placed, one on each side, towards the middle, and three on a line at the beginning of the belly; one is under, and a little behind, the root of the pectoral, and the two others near one another and more backwards; the entire carapace is very rough, covered with small tubercles, disposed in long quadrilaters, but not radiant; the fins have eleven rays at the dorsal, ten at the caudal, nine at the anal, eleven at the pectorals; the caudal fin is rounded at its extremity; it is long, being equal to the length of the snout from its extremity to the lower margin of the eye; the height of the body is contained one and a-half times in its length, to the base of the caudal, and the distance from the end of the snout to the upper base of the pectoral is contained twice in the total length of the body, including the caudal; the eye is contained two and a-half times in the same distance; on the belly pentagonal shields are well marked, they have an internal line and a small tubercle in the centre; on this part (the belly) there is no other rugosities or tubercles; the posterior part is not covered by the carapace, and is smooth.

The upper and lateral parts of the body are of a dark purple, covered with numerous white, narrow, longitudinal lines, running all round the body: these are sometimes united two together or are interrupted; on the cheeks they number four, having between them five purple ones broader than the others; the belly is of a beautiful uniform orange colour; the fins have a light yellow tinge, without any spots; the eye is yellow.

The teeth are in small numbers, spaced, but rather large and conic. I have seen two specimens of this beautiful little sort—one caught in the cold and the other in the warm season; each was two inches long. It is evidently nearly allied to *Ostracion Auritus*, that I have received from Swan River, and which has exactly the same colours, but appears different; I thought it might be the young of that species, but I have lately received from Tasmania (Hobart Town), under the name of *Cow-fish*, a specimen of *Auritus*, only two inches six-eighths long, in which the arched spines are stronger even than those of the adult specimens, six inches long; it is still nearer allied to *Ornata* (Gray), from Adelaide, but it is also distinct from it by its spines, the anterior profile of the head falling still more abruptly, &c.

DIODON.

This genus is found in all the tropical seas of the world; its body is covered with spines; the fish can swell itself out as a globe, and takes such an extraordinary appearance, that sailors and travellers are very apt to collect it, as an object of curiosity. There is no stronger proof of the semi-tropical nature of all the Australian seas than the frequent occurrence of these fishes in the most southern parts of this continent. Dr. Gunther limits this genus of Linnæus to the sorts who have "jaws without a medium suture, body covered with dermal ossifications, each with a pair of lateral roots, and with a stiff, moveable, and erectile spine; nasal tentacle simple, with a pair of lateral openings."

DIODON SPINOSISSIMUS.

Diodon Spinosissimus, *Cuvier, Mem. Mus.*, vol. iv., p. 34.

It is with great doubt I place under this name the present fish, but having at my disposal no means of comparison, I prefer not complicating still more the synonyma of a family which requires already a special study, but I believe the number of admitted species will, when this takes place, be very much increased. General appearance of *Diodon Histrix* of Bloch; nasal tentacle formed of a short simple tube, with a pair of lateral openings; mouth small, its opening being less than the diameter of the orbit; spines very numerous, long, slender, all of about equal length; the root of each has three ridges; the tail has no spine, but there is one rather stronger than the others on each side of the body at its base. Dorsal fin with twelve rays; caudal elongate, of eight rays; anal of the size of the dorsal, of twelve rays; pectorals of twenty-two.

The body is, on its upper half, of a light green; the lower one is white; on each side there are three faint black blotches of an irregular form; the spines and fins are of a light yellowish green, those of the lower parts are white; eye yellow; no spots on the fins.

I have two specimens, both about three and a-half inches long.

DIODON BLOCHII.

(*The Sea Hog.*)

This may prove to belong to one of the already described species, but I can identify it with none. General appearance of *Diodon Atinga* of Bloch, but spines much less numerous. The head is broad, and the mouth very wide; nasal tantacle formed of a simple tube, with a pair of lateral openings; the jaws are formed of numerous distinct teeth solved together, and forming numerous tubercles inside of the mouth, particularly at the lower jaw; the opening of the mouth is about one and a-half the great diameter of the orbit, and the space from one eye to the other about twice that diameter; in front there are five spines on the first row in front of the eyes; they form in all eleven or twelve irregular transverse lines, they are very strong, particularly the posterior ones. The dorsal fin has thirteen rays, the caudal nine; the anal is much larger than the dorsal, and has thirteen rays; the pectorals are about as long as the space between the eyes, of nineteen rays. Each spine has two long roots and an anterior ridge.

The colour is of a rather light green on the back, with the lower parts white; the lips are flesh colour, and the head purple; the abdomen is rather rosy; at the root of each spine there is a very faint dark brown spot, and on the posterior part of the body some purple blotches; the fins are of a light green, without any spots, but their external portion is rather darker; the eye is yellow, with its external part orange, and surrounded by a blue ring. The air-bladder is very large, rounded, and strongly bilobed.

Six inches long; rather common.

I should have taken this for the *D. Maculatus*, but Dr. Gunther gives it from sixteen to nineteen lines of spines; perhaps it is the *Atopomycterus Bocagei*, of Steindachner, from Sydney, quoted by him as being probably the same sort.

CHILOMYCTERUS.

Separated by Dr. Kaup from *Diodon*, and characterised by Dr. Gunther as having "jaws without median suture, body covered with ossifications, all, or most of which, consist of three horizontal roots, and a stiff, erect, immoveable spine; nasal tentacle

simple with a pair of lateral openings." Nine or ten sorts are known from all the seas situated between the tropics; they have the general form of *Diodon*.

CHILOMYCTERUS JACULIFERUS.

Diodon Jaculiferus, *Cus. Mem. Mus.*, vol. vii., p. 3.
Chilomycterus Jaculiferus, *Gunther, Catal.*, vol. viii., p, 313.

(*The Globe.*)

My specimen agrees very well with Dr. Gunther's excellent description of this sort, but the spines are all about of equal length, and rather short; the posterior, if any, being the longest. I find the dorsal large, formed of sixteen rays; the caudal rounded posteriorly, of nine rays; the anal is much smaller than the dorsal, but is not complete in my specimen, and I only see the roots of six rays; the pectorals have twenty rays.

The colour is of a light green on the upper part, and white below; all the spines are white, but those of the back have a black rounded spot at their base; the fins are of a yellowish green, with the end of the dorsal and caudal darker; the anal is white; the eye was, on the living specimen, of a dark brown, with an internal yellow circle. This fish, when inflated, forms a perfect globe.

The specimen is four and a-half inches long. From Hobson's Bay The air-bladder is large, rounded, and strongly bifurcated.

Group MOLINA.

Body compressed, very short, not extensible by air; tail extremely short, truncate, vertical; fins confluent; no pelvic bone; air-bladder absent.

ORTHAGORISCUS.

The *Sun-fish* is sometimes found on the Victorian coast, and is considered by Dr. Gunther and Professor M'Coy as belonging to the European sort. The first also includes with *Orthagoriscus Mola* the sort described by me at the Cape of Good Hope under the name of *Pedalion Capensis*. He states that the remarkable nose-

like hump it presents is the sign of old age, This is very possible, as a similar fact is known to exist in *Pagrus* and others; but according to this my South African specimen, which weighed one hundred and fifty pounds, was an old adult; and one caught off Western Port, in the beginning of September, weighing over four hundred, would only be a young one, as there was no indice of this excrescence. This requires some explanation.

The colour of the Australian fish was of a brownish red.

Sub-Class II. DIPNOI.

"Fishes with the skeleton partly cartilaginous, partly osseous; no occipital condyle. Bulbus arteriosus with two longitudinal valves; air-bladder double, lung-like, communicating by a duct and glottis with the hæmal side of the æsophagus, with a pulmonary vein. A narrow gill-opening on each side, with a rudimentary gill-cover; some of the branchial arches without gills; gills free, membranaceous. Nostrils double on each side. Intestine with a spiral valve. Optic nerves not decussating. Oviducts distinct. Ventral fins abdominal."

SIRENOIDEI.

"Body eel-shaped, covered with cycloid scales Vertical fins a continuous border to the compressed tapering tail. Pectoral and ventral fins subulate. A single maxillary dental plate is opposed to a single mandibular one. Scapular arch attached to the occiput. Vent not in the median line. No pseudobranchiæ.

"Fresh-water fishes of tropical Africa, America, and Australia."

No sort of *Sirenoidæ* has been yet found in the southern parts of Australia, and as those known are all from tropical regions, it is not very probable that any do inhabit them.

Mr. Krefft has made known a sort of *Ceratodus* (Fosteri), found in Queensland by Mr. Masters, which probably belongs to this family.

Dr. Gunther, with his usual urbanity, says that I have made some additions to the *synonymy* of the *Lepidosirens* in my work on the animals of South America; I think that I have done something more, in making better known the singular dentition of those animals, in pointing out the curious anomaly they present in the want of symmetry of the position of the anus, which is not situated on the median line of the body, but on its right side. The learned doctor declares also that my *Dissimilis* is the same as *Paradoxa;* but as of each there is only, if I am not mistaken, one specimen known (at least this was the case some few years ago), and as they are in very distant museums, I do not believe he has compared them; I even doubt very much if he has ever seen one or the other.

Sub-Class III.—GANOIDEI.

"Not yet discovered in Australia."

Sub-Class IV.—CHONDROPTERYGII.

"Skeleton cartilaginous; skull with sutures. Body with medial and paired fins, the hinder pair abdominal; caudal fin with produced upper lobe. Gills attached to the skin by the outer margin, with several intervening gill-openings; rarely one gill-opening only. No gill-cover. No air-bladder. Three series of valves, in the bulbus arteriosus. Intestine with a spiral valve. Optic nerves commissurally united, not decussating. Ovaries with few and large ova, which are impregnated, and, in some, developed

internally. Embryo with deciduous external gills. Males with prehensile organs attached to the ventral fins."

Order I. HOLOCEPHALA.

"One external gill-opening only, covered by a fold of the skin, which encloses a rudimentary cartilaginous gill-cover; four branchial clefts within the gill-cavity. The maxillary and palatal apparatus coalescent with the skull."

CHIMÆRIDÆ.

"Form of the body elongate; pectoral fins free; anterior dorsal fin above the pectorals. Mouth inferior. Dental organs confluent into two pairs of laminæ in the upper jaw and into one pair in the lower. No spiracles. Males with a peculiar prehensile organ in the upper part of the snout. Skin naked in the adult."

CALLORHYNCHUS.

Formed by Gronovius on a most curious fish, whose rounded head has a snout ended in a cutaneous flap.

CALLORHYNCHUS ANTARCTICUS.

Chimæra Callorhynchus, *Lin. Syst. Nat.*, vol. i., p. 402.
Callorhynchus Antarcticus, *Cuv., Règ. Anim.*, vol. ii., p. 372.
Callorhynchus Tasmanius, *Richard., Trans. Zool. Society*, vol. iii., p. 696.

(*Southern Chimera.*)

This singular fish is common at the Cape of Good Hope, but appears very scarce in the Victorian sea, as I have only

seen one specimen at one of the fishmonger's (Allen), in the month of March. Professor M'Coy says it is common near Portland, in the western part of the Colony, and it has also been found in Tasmania.

The colour is of a silvery grey, darker on the back, but without spots or bands.

Order II. PLAGIOSTOMATA.

"From five to seven gill-openings. Jaws distinct from skull."

Sub-order I. SELACHOIDEI.

"Gill-openings lateral. Body more or less cylindrical."

(SHARKS.)

CARCHARIIDÆ.

"The first dorsal fin opposite to the space between pectoral and ventral fins without spine; an anal fin. Eye with a nictitating membrane. Mouth crescent-shaped, inferior."

I have found it, until now, almost impossible to induce the fishermen to bring to the market specimens of sharks, which are, unfortunately, but too common in Hobson's Bay. The only sorts I have been able to obtain are the following, but many more inhabit these waters. It is is curious that none of the handsomely spotted sorts, that are so common at the Cape of Good Hope, are found here.

ZYGÆNA.

Formed by Cuvier on curious sorts of sharks, having the head made like a hammer.

ZYGÆNA MALLEUS.

Zygæna, *Rondel.*, p. 389.
Squalus Zygæna, *Liss.*, *Syst. Nat.*, p. 399.

(*Hammer Shark.*)

This sort is found commonly in Hobson's Bay. I have had no opportunity of comparing it with European specimens, but Professor M'Coy considers it as similar.

GALEUS.

This genus is due to Cuvier, who established it in his magnificent work, the "Règne Animal."

GALEOUS CANIS.

Galeus Canis, *Rondelet.*, p. 377.
Squalus Galeus, *Lin.*, *Syst. Nat.*, vol. i., p. 397.

(*The Tope.*)

Common in Hobson's Bay, and appears similar to the European sort. It does not attain very large dimensions, and is entirely grey.

MUSTELUS.

Genus also due to Cuvier.

MUSTELUS ANTARCTICUS.

Mustelus Antarcticus, *Gunther*, *Catal.*, vol viii., p. 387.

(*Smooth Head.*)

This is also very common in Hobson's Bay; it is entirely of a grey colour. Professor M'Coy had considered it as similar to the European *Must. Vulgaris*, but Dr. Gunther separates it on account of the origin of its dorsal fin being behind the inner posterior angle at the pectoral, when in *Vulgaris* it is nearly opposite to the middle of the inner margin of that fin.

These two last sharks are the most common sorts found in Hobson's Bay. They may be very easily distinguished by the teeth, which in *Galeus Canis* are sharp and serrated, and in *Mustelus* are disposed as a pavement.

CHARCHARIAS.

One sort is also stated by Professor M'Coy as having been recently found in Hobson's Bay.

CHARCHARIAS MELANOPTERUS.

Charcharias Melanopterus, *Quoy et Gaim., Voy. de l'Uraine Zool.*, p. 194, pl. 43, figs. 1-2.

Professor M'Coy says that he has only seen one specimen, fifteen feet long.

LAMNIDÆ.

"The first dorsal opposite to the space between the pectoral and ventral fins, without spine; no anal fin. No nictitating membrane. Mouth crescent-shaped, inferior; nostrils not confluent with the mouth. Gill-openings generally wide. Spiracles none, or minute."

ODONTASPIS.

Genus of Agassiz, established in his work on the fossil fishes.

ODONTASPIS TAURUS.

Odontaspis Taurus, *Rafinesque, Muller & Henle*, p. 73, pl. 30.

Professor M'Coy says that this shark is common in the Victorian waters, but I have not yet obtained a specimen of it.

HEPTANCHUS.

Formed by Muller and Henle in their valuable work on the *Plagiostomidæ*. *Heptanchus Indicus* is said to be found in the Bay, but I can only repeat for this the same as I have stated for the precedent.

SCYLLIIDÆ.

"The first dorsal fins above or behind the ventrals, without spine; an anal fin. No membranæ nictitans. Spiracle always distinct. Mouth inferior. Teeth small, several series being generally in function."

I have received *Scyllium Maculatum* from Hobart Town, through Mr. Lavington Roop; but I have not seen it from the Victorian waters.

CESTRACIONTIDÆ.

"Two dorsal fins, with spines, the first opposite to the space between the pectorals and ventrals; the second in advance of the anal. Nostrils and buccal cavity confluent. Mouth rather narrow, the upper lip divided into seven lobes, the lower with a fold. Spiracles small, below the posterior part of the eye. Gill-openings rather narrow. Dentition similar in both jaws, viz., small obtuse teeth in front, which in young individuals are pointed and provided with from three to five cups. The lateral teeth large, pad-like, twice as broad as long, arranged in oblique series, one series being formed by much larger teeth than those on the other series.

"Pacific and East Indian Archipelago."

CESTRACION.

Formed by Cuvier on a most singular shark, which can be easily recognised by its two dorsal fins having each a strong spine, and by its singular dentition in form of pavement, with the posterior teeth much larger. This genus has been called *Heterodontus* by Blainville.

CESTRACION PHILIPPI.

Squalus Philippi, *Bloch, Schn.*, p 134.
Port Jackson Shark, *Phillip, Voyage*, p. 283.

This sort does not attain very large dimensions, a specimen of three feet and a-half long being considered by the Hobson's Bay fishermen as being of rare occurrence. In one, of that size, the teeth are almost entirely obtuse; but in another of thirty-two inches long they are conic and pointed.

The upper parts are of a light brown, marbled with yellow, and the lower ones of a beautiful white; these fine yellow tinges extend along the sides and above the pectorals.

The colour is similar in all the specimens I have seen, and I believe that those with black bands, mentioned by Dr. Gunther, belong to a different sort, properly called *Zebra* by Mr. Gray (*Chondropterigii* of the British Museum), and which inhabits Japan and some parts of India.

Dr. Gunther describes a second Australian sort (*Galeatus*) of this genus, in which the anal fin reaches the root of the caudal; I have not seen it.

SPINACIDÆ.

"Two dorsal fins, no anal. Mouth but slightly arched; a long, deep, straight oblique groove on each side of the mouth. Spiracles present; Gill-openings narrow. Pectoral fins not notched at their origin."

Acanthias Vulgaris is found in Australia, but I have not seen it from Victoria.

PRISTIOPHORIDÆ.

"The rostral cartilage is produced into an exceedingly long flat laminæ, armed along each edge with a series of teeth (saw)."

PRISTIPHORUS.

Formed by Muller and Henle.

PRISTIPHORUS CIRRATUS.

Pristis Cirratus, *Latham*, *Trans. Lin. Soc.*, vol. ii., 1794, p. 281, pl. 26.

————————, *Bloch*, *Schn.*, pl. 70 (the head only).

The saw, from its extremity to the anterior edge of the orbit, is contained four and one-third times in the total length of the fish; the distance between the tentacles and nostrils equals that between the nostrils and the fourth gill-opening; the fins are entirely covered with very minute scales, as is also the body.

The colour is entirely grey.

I have not seen this sort from Victoria, but I have received it from Hobart Town, through the kindness of Mr. Lavington Roop.

PRISTIPHORUS NUDIPINNIS.

Pristiphorus Nudipinnis, *Gunther*, *Catal.*, vol. viii., p. 42.

(*Saw Fish.*)

This sort is very nearly allied to the precedent, but has been most properly separated from it by Dr. Gunther. The saw is not so long, being contained four and three-quarter times in the total length; this saw is also broader at its base; the distance between the tentacle and nostril is considerably less than that between the nostril and the first gill-opening. A portion of the pectorals and of the dorsal is denudated of scales, but the extent of this portion is subject to considerable variation.

The colour is of a light grey, with the pectorals and ventrals reddish.

Common in Hobson's Bay.

RHINIDÆ.

"Spiracle wide behind the eyes. Nostrils with skinny flaps on the margin of the snout. Teeth conical, pointed, distant. Dorsal fins without spines on the tail; no anal.

"Temperate and tropical seas."

One single genus formed by Dumeril.

RHINA.

RHINA SQUATINA.

Squatina Bellon, *De Aquat*, p. 78.
Squalus Squatina, *Lin. Syst. Nat.*, vol. i., p. 396.

(Angel Shark.)

I have no means of comparing this fish with the European form, but it is admitted that they are similar.

The colour is of a light chesnut, with some rounded whitish spots on the pectorals and ventrals; the fins are bordered with pink; the lower parts of the body are white, with a rosy tinge.

The colours are different from those of Bloch's plate; but they agree well with Risso's description. These two authors state that the back is covered with large acute tubercles. In the smallest Australian specimens, the dorsal tubercles are very small, and similar to the others, of the upper surface of the body; but in the larger ones, they are considerably larger, and at the base of the tail, in front of the first dorsal, they become arched spines. The teeth are on one single line, when Risso states that in the European fish they are on three; but Bloch says that in his specimens (one foot long) the teeth are on three series at the upper jaw and on two on the lower, and adds that the lines of teeth increase with age, and this is probable, as my specimens are only seven to nine inches in length, and are evidently very young.

I have seen three specimens at the Melbourne Market in the months of November and December.

Sub-order II. BATOIDEI.

"Gill-openings ventral. In a few of the genera, which we place first, the habit is still that of the sharks; but the body is depressed; and in the typical genera the trunk, which is surrounded by the immensely developed pectoral fins, forms a broad flat disk, with a thin and slender tail. Spiracles always present. Five pairs of gill-openings. No anal fin; dorsal fins, if present, on the tail.

"Temperate and tropical seas; some species pelagic; some entering fresh waters or entirely limited to rivers within the tropics."

(RAYS.)

PRISTIDÆ.

"The snout is produced into an exceedingly long, flat lamina, armed with a series of strong teeth along each edge, (saw)."

RHINOBATIDÆ.

"Tail strong and long, with two well-developed dorsal fins; a caudal and a longitudinal fold on each side. Disk not excessively dilated, the rayed portion of the pectoral fins not being continued to the snout. No electric organ."

TRYGONORHINA.

Founded by Muller and Henle, on a sort found in the Straits of Bass, and which appears sometimes in the Melbourne Market.

TRYGONORHINA FASCIATA.

Trygonorhina Fasciata, *Muller and Henle*, p. 124, fig. 43.

(*The Fidler.*)

Body of a light brown, with the margin of the pectorals and the fins reddish; four or five irregular, transverse bands, appear on the back, but do not extend far on the pectorals; they are of a fine light blue, bordered with dark brown; lower parts of the body of a reddish white; eye yellow.

Its flesh is considered good for the table, but scarce.

TORPEDINIDÆ.

"The trunk is a broad, smooth disk; tail with rayed dorsal (absent in Teniera) and caudal fins, and a longitudinal fold along each side. Anterior nasal valves confluent into a quadrangular lobe. An electric organ, composed of vertical hexagonal tubes between the pectoral fins and the head."

NARCINE.

Separated from *Torpedo* by Henle; it contains several tropical sorts, and one from the southern seas of Australia.

NARCINE TASMANIENSIS.

Narcine Tasmaniensis, *Richard.*, *Proc. Zool. Soc.*, 1841, p. 22.

Elliptical; of a brownish purple; eye yellow.

Attains a large size, and I have seen, on the St. Kilda beach, a mutilated specimen, measuring over six feet in length. Found in Bass's Straits and in the Hobart Town sea.

RAJIDÆ.

"Disk broad, rhombic, generally with asperities or spines; tail with a longitudinal fold on each side. The pectorals extend to the snout. No electric organ. No serrated caudal spine."

The only two sorts I have observed belong to the following genus:—

RAJA.

RAJA LEMPRIERI.

Raja Lemprieri, *Richard.*, *Erebus and Terror*, p. 34, pl. 23.

(*Thorn Back.*)

Snout short. The fish is of a fleshy colour, rather green on the back and the upper part of the tail, and of a reddish purple on the sides of the pectorals; the spines seem to be subject to considerable variation; on young specimens there is, on each side of the pectorals, two series of slender, arched, but very acute spines; in the older ones, there is only one series of these; but on the contrary, those of the tail of the young specimens are only disposed on one line on the middle of its upper part, when in the larger specimens they form three series on the upper part of this organ. In dried specimens, the lateral part of the pectorals, and also the portion situated on the sides of the snout, appear of a light yellow colour, as they are represented on Richardson's plate.

Common.

RAJA OXYRHYNCHUS.

Raja Oxyrhynchus, *Lyn. Syst. Nat.*, vol. i., p. 395.

(*Common Ray.*)

The snout long; body entirely covered with asperities, which are more considerable on the snout, where they form small triangular points; on the lower surface of this part of the edges of the ventrals, up to the height of the eyes, these points are

considerable and crowded. The anterior profile is deeply concave; the angle of the pectorals is rather pointed; there are no spines round the eyes, but a series of three or four is seen on each side of the back, and ends before the insertion of the ventrals; the tail is armed with three series of strong tuberculous spines, and one or two are seen on the middle of the back behind the head. The teeth are rather large, like pavement, and numerous.

The general colour is of a greyish purple, with the sides reddish; all the body is covered with rounded white spots. This sort is very common in the market, and is esteemed for the table.

It is always with doubt that I admit that a fish from the Antarctic Seas is specifically similar to an European one, more so as I have no specimens of the latter region for comparison; but the descriptions and figures of *Oxyrhynchus*, that I have at my disposal, agree so well with the Australian fish that I should not be justified in separating them. I think, also, that *Raja Nasuta* of Muller and Henle, which is established on a figure drawn in New Zealand by Solander, will prove to belong to this species.

The egg is large, of the usual form in *Rays*, of a silky green. In a large female I found one large egg on each side, and numerous small ones.

MYLIOBATIDÆ.

"The disk is very broad in consequence of the great development of the pectoral fins, which, however, leave the sides of the head free, and reappear at the extremity of the snout as a pair of detached (cephalic) fins."

MYLIOBATIS.

Genus formed by Cuvier, and containing nine or ten sorts, of which two are found in the South Australian Seas.

MYLIOBATIS AQUILA.

Raja Aquila, *Lin.*, *Syst. Nat.*, vol. i., p. 396.

Coloration of a dark green, almost uniform.

Often found by the fisherman in Hobson's Bay, but never brought to the Market; it seems not to differ from the Mediterranean specimens.

MYLIOBATIS NIEUHOFII.

Raja Nieuhofii, *Bloch, Schneid.*, p. 364.

Body of a fine light brown yellow; with four or five transverse bands of a beautiful blue; these bands are irregular and interrupted; the tail and ventrals have a greenish hue.

Only seen once at the Melbourne Market, in the month of October, and the specimen was most kindly sent to me by Dr. T. Black. I had previously seen several specimens from Singapore and Malacca.

Sub-class V. CYCLOLTOMATA.

"Skeleton cartilaginous and metochordal, without ribs, and without real jaws. Skull not separate from the vertebral column. No limbs. Gills in form of fixed sacs, without branchial arches, six or seven in number of each side. One nasal aperture only. Heart without brilbus arteriosus. Mouth anterior, surrounded by a circular or sub-circular lip, suctorial. Alimentary anal straight, simple without cæcal appendages pancreas, or spleen. Generative outlet peritoneal. Vertical fins rayed.

PETROMYZONTIDÆ.

"Body eel-shaped, naked. Subject to a metamorphosis. In the perfect stage with a suctorial mouth, armed with teeth, simple or multicuspid, horny, sitting on a soft papilla. Maxillary, mandibulary, lingual, and suctorial teeth may be dis-

tinguished. Eyes present (in native animals). External nasal aperture in the middle of the upper side of the head. The nasal duct terminates without perforating the palate. Seven branchial sacs and apertures on each side behind the head. The inner branchial ducts terminate in a separate common tube. Intestines with a spiral valve. Eggs small. The larvæ without teeth, and with a single continuous vertical fin.

"Inhabitants of the fresh waters and coasts of the temperate regions of both hemispheres. Suck themselves fast to other fish, and live by scraping off their flesh."

I find the greatest difficulty in the determination of the Victorian fishes of this family; there are two types, one of which has the second dorsal united with the caudal, and the other which has it separate; but the most important character, the dentition, seems to be subject to the most extraordinary variations; in fact, I cannot find it exactly similar in two specimens. The teeth have horny coverings, which are very apt to fall, and this changes entirely the appearance of the mouth. The one having the second dorsal separated from the caudal is a *Geotria* for Dr. Gunther.

GEOTRIA.

GEOTRIA AUSTRALIS?

Geotria Australis? *Gray, Proc. Zool. Soc.*, 1851, *Chondrop.*, p. 142, pl. 2.

Formed by Dr. Gray on a most singular Australian sort, but Dr. Gunther unites with it the genus *Velasia*, of the same author, from Chili, in which there is no trace of a pouch. The mouth is rounded, but rather angular, with the lateral lobes broad; it is fringed all round. The maxillary lamina is formed of four teeth, the exterior of which are flat lobes, and the two interior ones, long, conical

pointed teeth. The mandibulary lamina is large, and forms a transverse crescent ridge, like the teeth of a *Scarus*, and showing at its edge faint traces of teeth. I believe it is not externally visible in the living specimens. Suctorial teeth in numerous transverse series, those situated backwards larger than the others; lingual teeth, two in number, straight, strong, and conical. Seven branchial openings, large, round, and bordered. The distance between the two dorsals and the base of the caudal is a little more than the diameter of the mouth, and this is equal to half the distance from the end of the snout to the anterior edge of the eye. The caudal fin is discoid, and rounded at its extremity.

The colour is of a dark blue on the back, and silvery on the sides and belly; on the middle of the back, a little before the insertion of the first dorsal, begins a space of a brilliant green, which extends to the tail; fins red, bordered with black.

Found in the Saltwater River. The following are its dimensions :—

	Inches.
Total length	$20\frac{1}{2}$
Circumference of the middle of body	$2\frac{5}{8}$
From muzzle to centre of eye	$1\frac{1}{8}$
———— to first branchiostegal opening	$1\frac{1}{2}$
———— to last ————	$3\frac{1}{8}$
———— to beginning of first dorsal	$12\frac{7}{8}$
Length of first dorsal	$1\frac{3}{4}$
From first dorsal to beginning of second	$1\frac{5}{8}$
Length of second dorsal	$1\frac{7}{8}$
From second dorsal to beginning of caudal	$\frac{7}{8}$
From beginning of caudal to end of body	$1\frac{1}{4}$
From end of body to anus	$5\frac{1}{4}$

A very young individual, only three inches long, has exactly the same form, the same dimensions, and the same dentition.

Mr. F. G. Waterhouse has kindly sent me, from the Torrens River, Adelaide, a specimen of the only sort said to inhabit those waters, and which I felt a great desire to examine, as the typical specimen of *Geotria* was said to have come from that Colony. This specimen is exactly like the one from the Saltwater River, only one of the suctatorial teeth are long and sharp, and this is caused

by their having preserved their horny coverings. It has no trace of the gutteral pouch, and so I believe that this is accidental, or rather belongs to a particular state of some specimens, perhaps to the old individuals of one sex. The only dental difference between *Geotria and Mordax* seems to be the presence in the latter of the two groups of three long teeth in the maxillary. Nothing shows better the remarkable knowledge that Dr. Gunther possesses of fish than his not having taken the extraordinary gular sac as a generic character; but I cannot consider the specimens which do not possess it to be young, as the length of the one I have described here is a little more considerable than that of the type in the British Museum (twenty inches).

In the list of the *Chondropterygii* of the British Museum it is said that the type, which was given to that institution by Mr. Pain, was from a river *Inkar Pinki*, in South Australia, but there must be some confusion, as that gentleman tells me that he picked it up on the Brighton beach, Hobson's Bay.

MORDACIA.

Formed by Gray on a *Lamprey* from Tasmania, which has appeared to Dr. Gunther to be similar to one from Chili. There is no doubt that the two belong to the same genus, but it is very improbable that they should be specifically similar.

MORDACIA MORDAX.

Petromyzon Mordax, *Richard, Loc. Cit.*, p. 62, pl. 38, fig. 3.
Mordacia Mordax, *Gray, Chondropterygii of the Brit. Mus.*, p. 142
——————— *Gunther, Catal.*, vol. viii., p. 508.

(*The Lamprey.*)

The mouth is elleptical; the lateral lobes not broad nor fringed; mandibulary lamina not visible externally, but bearing seven to nine acute conical cusps, which, when the horny coverings fall, have the appearance of tubercles. On the maxillary is, on each side, a group of three conical, acute teeth, directed backwards, and placed one in front and two behind; suctatorial teeth forming a circle round the lips; they are small, and number at least twenty; behind them is a series of much larger ones, very broad at their base, and very acute; in front, three of them are disposed in a triangle; the others emit a sort of transverse ridge

which on the sides bears on other teeth, so as to be bifid in this part; those placed at the lower part of the mouth are even bifid. Lingual teeth formed of two large ones; canines very strongly serrated, even denticulated, at their under side, which is arched. The head has a rather pointed appearance, which is caused by the lips not falling, as in *Geotria;* the eye is small; the branchial openings are much less distinct, being placed under a fold of the skin; they number seven. The first dorsal is rather triangular, and situated at a considerable distance from the second, which is high at its beginning, and lowers considerably before it joins the caudal; this last is rather pointed.

The colour is of a blueish grey, darker on the back; the head is yellowish; the eye silvery; the first dorsal is grey; the second is bordered with pink, and has its posterior part black; the caudal is of that last colour, but has a pink margin.

These fish are commonly found in the Yarra at its lower part; they are considered good food. Their motions are very rapid; they are very voracious, and pursue any object in the water, and they adhere to it with an extraordinary and ferocious tenacity.

Dr. Gray's figure (*Chondropt.*) is copied from Richardson's, which, as Dr. Gunther has already observed, is not correct in showing the dentition. I thought at first that the bifid, and sometimes trifid, teeth of the Victorian specimens would constitute them into a separate species, but the coverings of the teeth fall off so frequently in the specimens preserved in spirits, and change so much the appearance of these organs, that, after examining many specimens, I believe they all belong to the same sort.

The average length is from fifteen to seventeen inches. I have taken on one the following measurements :—

	Inches.
Total length	15¼
From the end of snout to anterior edge of eye.....	1
Diameter of eye	1-7
Circumference	2⅛
From end of snout to first dorsal	6½
Length of first dorsal	6½
From end of first dorsal to base of second	1⅜
From base of second to extremity of caudal.....	3¾
Height of second dorsal at its base	⅜

The difference in the form of the lingual teeth indicated by the authors do not exist in *Geotria*, and in *Mordacia* they are similar, being, when seen in front, like two small horns, and, when sideways, having the appearance of serrated arches.

Nota.—I consider as belonging to the *Ammocœtes* type, or larval stage, a singular little *Petromyzonid*, which was found in the Yarra. The body is eel-shaped, naked, cylindrical, and elongate, being twenty-three times as long as high ; it is entirely divided in annular rings, which appearance seems due to the muscular flakes being very visible through the smooth skin. I can see no teeth ; the upper lip is flat, and considerably prolongated over the buccal aperture ; it is truncated in front, and this part, seen upperly, is rather bifurcated. The lateral line is well marked in all the length of the body ; there is only one dorsal, which begins at about two-thirds of the length of the body, and is joined with the caudal and the anal ; the latter is considerably shorter than the dorsal ; these fins are all equal in their length ; no eye visible. The skin of the throat is rather extensible ; the prolongation of the upper lip over the lower is equal to the height of the body ; the tail is pointed.

The colour is of a light green, with the belly white ; on the back extends a narrow longitudinal line ; the head and throat are pink, and the fins of the same colour. Total length, four and three-eighth inches.

I should have thought this might be the first state of *Geotria*, but we have just seen that I had a still smaller specimen of this, which has entirely the form of the adult. In this state of things, I propose giving provisionally to this the name of *Yarra Singularis*.

In a dried state, the prolongated part of the head is apt to bend upwards, which gives the fish rather the appearance of a *Syngnathus*. The branchial apparatus are visible ; the body is remarkably soft, which makes it very difficult to examine it ; no barbels round the mouth.

It was found in Captain Sinnot's dock, on the lower Yarra, in brackish water.

NEOMORDACIA.

I propose giving this name to a very small lamprey, which has no first dorsal, or rather has only one dorsal, separate and rather distant from the caudal; this forms a broad oval, and is angulous at its extremity. Form of *Mordacia*.

NEOMORDACIA HOWITTII.

Height of body about nineteen times in its total length; the length of the snout, up to the external edge of the eye, a little longer than the height of the body; the head is not inflated, and follows on to the snout by an arched line, and on the body by a straight one; the dentition is very difficult to be distinctly seen with the weak magnifying power I possess, but I observe a row of strong conical and pointed teeth placed round the mouth, and wide apart; a few teeth on each side larger than the others, and inserted forwards. I can only say that there are others further back, and a few appear tricuspid; there are a few fringes round the mouth; the branchiostegal apertures are seven; they are round, and begin at a short distance from the eye, which is large.

The first half of the body and the head are like reticulated, and covered with irregular excavations; the middle of the body is smooth, but the posterior part is again similar to the anterior.

Very different from the other lampreys. This has a hard body, and being incrustated with sand, I do not doubt but that it lives in perforated holes on the sea shore.

It is of a dark blue on the upper parts, and silvery below; the caudal fin is red, and the eye yellow; the muzzle black. The only specimen I have seen is about three inches long; it was found at Cape Shanck by my old and highly esteemed friend, Dr. Howitt.

MYSCINIDÆ.

"Body eel-shaped, naked. the single nasal aperture is above the mouth, quite at the extremity of the head, which is provided with four pairs of bar-

bels. Mouth without lips. Nasal duct with cartilaginous rings penetrating the palate. Median tooth on the palate, and two comb-like series of teeth on the tongue. Branchial apertures at a great distance from the head. The inner branchial ducts lead into the œsophagus. A series of mucous sacs along each side of the abdomen. Intestine without spiral valve. Eggs large with a horny case provided, with threads for an adhension.

"Inhabitants of the seas of the temperate regions of both hemispheres; burrow into other fishes, and feed on their flesh." (Gunther.)

Bdellostoma Cirrhatum (Bloch., Schneid., p. 582,) was found by Forster in New Zealand.

Sub-Class VI. LEPTOCARDII.

"Skeleton membrane, cartilaginous and notochordal, ribless, no brain. Pulsating sinues in place of heart. Blood colourless. Respiratory cavity confluent with the abdominal cavity; branchial clefts in great number, the water being expelled by an opening in front of the vent. Jaws none."

CIRROSTOMI.

"Body elongate, compressed, scaleless, limbless. Mouth a longitudinal fissure, with subrigid cirri on each side, inferior. Vent at a short distance from the extremity of the tail. A low rayless fin-like fold

runs along the back, round the tail, past the vent, to the respiratory aperture. Eye rudimentary. Liver reduced to a blind sack of the simple intestine. One genus only, occupying the lowest scale in the class of vertebrata.

"Found imbedded in sand on many coasts of the temperate regions of both hemispheres."

A sort of *Branchiostoma* was discovered by the Expedition of the *Harold* in Bass's Straits, at a depth of from ten to twelve fathoms. Dr. Gunther considers it similar to the European sort (*Limax Lanceolatus Pallas*). I have not seen it.

APPENDICE.

CYPRINIDÆ.

This family, so widely represented in India, has not, till this, appeared to be indigenous to Australia; but several sorts have been introduced, and one seems likely to prove indigenous.

1. Corassius Vulgaris, known as the *Prussian Carp*, has very well succeeded throughout the country. The specimens I have seen are absolutely similar to the European type.

2. Corassius Auratus—the *Gold Fish*. It presents a particular race, that I have thought proper to describe here.

CORASSIUS AURATUS. VAR.

Cyprinus Auratus, *Lin.*, *Bloch.*
Corassius Auratus, *Bleeker*, *Gunther*.

D. 3/17. A. 3/6. C. 19 long rays, and 4 small on each side.
P. 1/15. V. 1/8.

Height of the body twice and six-tenths of the total length to the middle of the open caudal; head four times in the same length. The body is broad, very much like the figure of *Cyp. Corassius*, given by Cuv. and Val.; the eye is one and two-third times in the snout, and a little over three times in the length of the head; the lateral line is rather arched, and extends over twenty-eight scales; these are large, with their external edge rather sinuous and reborded; they are in lines of eight over the lateral line (this line passing over the eighth), and seven below; the dorsal fin is very high, being nearly as broad as the portion of the back over the lateral line; it is formed of three spines, the first very minute, the second about four times, and the third nearly five times longer; this third spine is slender, curved, and has very strong teeth on its posterior part; the soft rays number seventeen, and are slender; the caudal, taken from its centre, is

one-sixth of the total height; it is strongly bilobed; the anus is rather long but narrow; it is formed of three spines and six soft rays; the first spine is very minute, the second about three times its length, and the third about four times as long as the second; this third is slender, and has some very feeble denticulations on its inner side; the pectorals are contained one and one-half times in the length of the head; it has a first hard ray and fifteen soft; the ventrals have one spine and eight soft rays, the spine being about two-thirds of the length of the first soft ray.

The general colour is of a beautiful yellow brown, with golden tinges; it degenerates into a brilliant white on the belly, the edge of which is rather yellow; the pectoral is bordered superiorly with black; the caudal tinged with red. The mouth has no teeth, and there are no barbels; the operculum and scales are covered with fine concentrical striæ; the eye is of a pale yellow; the mouth is extensible; the eye of moderate size; the second portion of the air-bladder is very elongate, and about two and one-half times as long as the other.

I have only seen one specimen in the Melbourne Market. It had been found in the Mordialoc River; but several others were sent to the Acclimatisation Society from Sydney, and there is no doubt that it is an introduced fish, but I do not know from what country it came direct.

Apart from this variety, which seems remarkably constant, the common Chinese *Auratus* is very widely spread in Melbourne, and presents all its usual beautiful colours.

3.—NEOCORASSIUS.

This is the only *Cyprinoid* sort on which I have considerable doubts as to its having been imported. The two specimens I have seen of it were caught in the Saltwater River, at Footscray, during the cold weather. The first was found a year ago, and I was so convinced that no fish of this family was to be found in Australia, that I thought it belonged to some imported sort of *Corassius*, of which it has the general appearance; but a second specimen having been recently found in the same locality, I examined it with more care, and I find it impossible to place it in any of the groups mentioned by Dr. Gunther, or any other author. I cannot, on the fresh specimen,

find any trace of teeth whatever; but by its anal fin being very short, formed of six branched rays, its lateral line running along the medium line of the tail; its dorsal fin with a strongly serrated spine, situated a little behind the ventrals, its abdomen compressed into a sharp ridge behind the ventrals, and the absence of barbels, it seems to come very near to Dr. Bleeker's genus, *Rohteicthys*; but the very large scales which cover its body make it distinct from this Indian genus, and its enormously developed belly gives it a very particular appearance.

I have just said that on the fresh specimens there is to trace whatever of teeth; but on the dried one there is visible on each side of the palate a very large horny tubercular one, having the form of a sugar loaf; but this seems only to have appeared through the skin by the effect of dessication.

NEOCARASSUIS VENTRICOSUS.

The body is very high, very thick, and the lower profile remarkably rounded and convex; the mouth is rather extensible. The height of the body is contained two and one-third times in the total length; head four and a-half times in the same; orbit four and four-tenth times in the length of head. No barbels; head without scales, except under the eye. The scales on the infraorbital are very large, in small number, radiated, and serrated on their edge; operculum covered with arched, convergent striæ; scales of the body very large—thirty on the lateral line, fifteen on the oblique one, of which seven are over the lateral line (which runs over the eighth); they are covered with fine concentric striæ; they appear, when seen through a lens, finely serrated. The lateral line is always straight, rather elevated near the head, and runs over the middle of the tail; it is formed of a succession of elevated ridges, which only extend over the two first thirds of the scale, and end (on the living specimen) by a rounded point of an obscure colour. The first dorsal is formed of four spines, of which the first is very small, the second rather longer, the third nearly three times as long as the second, and the fourth very long, rather strong, with numerous spinelets on its inner side; it is four times longer than the third. The rays number seventeen, and the first are longer than the longest spines, but they decrease in height as they extend backwards. The caudal is

emarginated, slightly bilobed, formed of nineteen long rays and of three or four small ones on each side. The external rays are about one-third longer than the centre ones. Anal short, contained nearly nine times in the total length, caudal included, and formed of two spines, of which the first is small, and the second five times longer; it is compressed, very strongly serrated on its inner side, and of six rays; the first of these is longer than the rays, and the last considerably shorter. The ventrals are formed of one rather long and slender spine, and of nine rays; the pectorals are inserted very low, much below the angle of the mouth, and have nineteen rays; they are a little shorter than the distance from the anterior edge of the orbit to the end of the operculum; the ventrals have one long, slender spine, and seven rays rather longer than the spine, which is neither notched nor serrated.

The colour of the first specimen was of a light gilt green on the upper and lateral parts, and of a silvery white below; the base of the scales very brilliant; the eye silvery; the throat and anterior part of the belly very brilliant and iridescent; the dorsal, caudal, and anal were of a greyish green; the ventrals white; the pectorals white at their base, and green in the remainder of their length.

The natatorial bladder is large, formed of two parts—the first about two-thirds as long as the other, but broader; it is rather bilobed in front; the second portion is oblong, and rounded at its extremity.

The second specimen was entirely of a beautiful red colour, with golden tinges on the sides of the head and body, very much like *Cyprinus Auratus*.

	Inches.
Length of first specimen	$9\frac{3}{8}$
Height of body	$3\frac{3}{8}$
Length of dorsal	$3\frac{1}{8}$
——— of pectoral	$1\frac{3}{8}$-$\frac{1}{2}$
——— of anal	$1\frac{1}{3}$

This second specimen—the one of a red colour—has a far more irregular form than the first, the back, behind the head, being very gibbous, and the lower profile still more inflated. Its length is eleven inches, and its height five and a-quarter.

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